Performing a Site Survey

This appendix explains how the site survey utility can be used when conducting a site survey. The following topics are covered in this appendix:

- Overview, page F-2
- Opening the Site Survey Utility, page F-3
- Selecting the Client Adapter, page F-3
- Using the Associated AP Status Tab, page F-4
- Using the AP Scan List Tab, page F-8
- Finding the Version of the Site Survey Utility, page F-15
- Accessing Online Help, page F-15
- Exiting the Site Survey Utility, page F-15
- Uninstalling the Site Survey Utility, page F-15
Overview

Note
This appendix applies only to people who are responsible for conducting a site survey to determine the best placement of infrastructure devices within a wireless network.

Note
The site survey utility is available in Install Wizard 2.0 and later.

The site survey utility can assist you in conducting a site survey. The utility operates at the RF level and is used to determine the best placement and coverage (overlap) for your network’s infrastructure devices. During a site survey, the current status of the network is read from the client adapter, and the status display is updated four times per second so you can accurately gauge network performance. The feedback that you receive can help you to eliminate areas of low RF signal levels that can result in a loss of connection between the client adapter and its associated access point (or other infrastructure device).

The site survey utility operates in a passive mode. That is, it does not initiate any RF network traffic; it simply listens to the traffic that the client adapter hears and displays the results.

Guidelines

Keep the following guidelines in mind when preparing to perform a site survey:

- Perform the site survey when the RF link is functioning with all other systems and noise sources operational.
- Execute the site survey entirely from the mobile station.

Additional Information

Also consider the following operating and environmental conditions when performing a site survey:

- **Data rates**—Sensitivity and range are inversely proportional to data bit rates. Therefore, the maximum radio range is achieved at the lowest workable data rate, and a decrease in receiver threshold sensitivity occurs as the radio data increases.

- **Antenna type and placement**—Proper antenna configuration is a critical factor in maximizing radio range. As a general rule, range increases in proportion to antenna height.

- **Physical environment**—Clear or open areas provide better radio range than closed or filled areas. Also, the less cluttered the work environment, the greater the range.

- **Obstructions**—A physical obstruction such as metal shelving or a steel pillar can hinder the performance of wireless devices. Avoid placing these devices in a location where a metal barrier is between the sending and receiving antennas.

- **Building materials**—Radio penetration is greatly influenced by the building material used in construction. For example, drywall construction allows greater range than concrete blocks, and metal or steel construction is a barrier to radio signals.

Note
Refer to the hardware installation guide for your infrastructure device for additional information on factors affecting placement.
Opening the Site Survey Utility

To open the site survey utility, choose Start > Programs > Cisco Aironet > Aironet Site Survey Utility.

**Note**

If you specified a different program folder during installation, you must access the site survey utility from that folder.

**Note**

The site survey utility is installed on your computer only if you checked the Install Site Survey Utility check box during the installation of the client adapter software. If you did not check this check box and want to use the site survey utility, uninstall the client adapter software and reinstall it, making sure to check the site survey check box.

Selecting the Client Adapter

**Note**

The site survey utility is supported for use with only CB21AG and PI21AG client adapters.

When the site survey utility starts, it scans for client adapters. If only one adapter is detected, it is selected automatically. However, if the utility detects multiple adapters or no adapters, the Select Adapter window appears (see Figure F-1).

**Note**

You can manually open this window at any time to select a different client adapter. Simply choose Select Adapter from the site survey utility’s Action drop-down menu.

**Figure F-1** Site Survey Utility - Select Adapter Window
Follow these steps to select the desired client adapter.

**Step 1**  
If you want to be able to choose client adapters that are installed but not physically present in your computer, check the **List installed devices even if not present in system** check box.

**Step 2**  
From the Select a Network Adapter list, select the client adapter that you want to use with the site survey utility.

*Note*  
Click **Refresh** to update the list of available client adapters (for instance, after an adapter has been ejected or inserted).

**Step 3**  
Click **OK** to save your selection and exit the Select Adapter window. The top of the site survey utility’s main window (see Figure F-2) shows the client adapter that is being used with the utility and its current association status (Associated, Not Associated, or Device Not Present).

### Figure F-2  
**Site Survey Utility - Top of Main Window**

![Cisco Aironet Site Survey Utility](image)

### Using the Associated AP Status Tab

You can perform two functions from the Associated AP Status tab:

- Specify display units, page F-4
- View the access point’s status, page F-5

Follow the instructions on the pages indicated to perform these functions.

### Specifying Display Units

The **Display in percent** check box at the bottom of the Associated AP Status tab enables you to specify how display units are shown.

*Note*  
This check box is available in site survey utility 1.1 and later.

- Unchecking this check box causes the signal strength and noise level to be shown in decibels with respect to milliwatts (dBm) and the signal-to-noise ratio to be shown in decibels (db). This option, which is the default value, provides a more accurate representation of the data being presented than the percentage option.
- Checking this check box causes the signal strength, signal quality or beacons received, and overall link quality to be shown as a percentage.
Viewing the Access Point's Status

The Associated AP Status tab shows the status of the access point to which your client adapter is associated. Figure F-3 shows the tab with display units shown in dBm, and Figure F-4 shows the tab with display units shown as a percentage.

Figure F-3  Site Survey Utility - Associated AP Status Tab (with Display Units in dBm)

![Cisco Aironet Site Survey Utility](image1)

Figure F-4  Site Survey Utility - Associated AP Status Tab (with Display Units as a Percentage)

![Cisco Aironet Site Survey Utility](image2)
Table F-1 interprets the information that is displayed on the Associated AP Status tab.

The trend graphs to the right of the smaller bar graphs provide a graphical representation of activity in the past 10 to 60 seconds. The height of an individual trend graph is proportional to the width of its corresponding bar graph. The time is displayed as a negative value to indicate that the data is older at the left edge of the graph than at the right. Use the up and down arrows to select the desired number of seconds from -10 through -60. The default value is -10.

### Table F-1  Site Survey Utility - Associated AP Status

<table>
<thead>
<tr>
<th>Associated AP Status Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Point</td>
<td>The access point to which your client adapter is associated. This field may show the access point’s name, IP address, and MAC address.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
</tr>
<tr>
<td>Channel</td>
<td>The channel and radio frequency that the access point is currently using for communications.</td>
</tr>
<tr>
<td></td>
<td><strong>Value:</strong></td>
</tr>
<tr>
<td>Signal Strength</td>
<td>The signal strength of the most recently received packets. The higher the value and the wider the bar graph, the stronger the signal.</td>
</tr>
<tr>
<td></td>
<td>The trend graph to the right of the bar graph provides a visual interpretation of the signal strength over time. Differences in signal strength are indicated by the following colors: green (strongest), yellow (middle of the range), and red (weakest).</td>
</tr>
<tr>
<td></td>
<td><strong>Range:</strong></td>
</tr>
</tbody>
</table>
### Table F-1 Site Survey Utility - Associated AP Status (continued)

<table>
<thead>
<tr>
<th>Associated AP Status Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise Level</td>
<td>The level of background radio frequency energy. The lower the value and the wider the bar graph, the less background noise present. The trend graph to the right of the bar graph provides a visual interpretation of the level of background noise over time. Differences in background noise level are indicated by the following colors: green (low noise), yellow (middle of the range), and red (high noise). <strong>Range:</strong> –45 to –95 dBm <strong>Note</strong> This parameter appears only if the Display in Percent check box is unchecked.</td>
</tr>
<tr>
<td>Signal Quality</td>
<td>The signal quality of the most recently received packets. The higher the value and the wider the bar graph, the clearer the signal. The trend graph to the right of bar graph provides a visual interpretation of the signal quality over time. Differences in signal quality are indicated by the following colors: green (highest quality), yellow (average), and red (lowest quality). <strong>Range:</strong> 0 to 100% <strong>Note</strong> This parameter appears only if the Display in Percent check box is checked.</td>
</tr>
<tr>
<td>Beacons Received</td>
<td>The percentage of beacon packets received from the access point versus those expected to be received. The higher the value and the wider the bar graph, the clearer the signal. The trend graph to the right of bar graph provides a visual interpretation of the signal clarity over time. Differences in signal clarity are indicated by the following colors: green (highest quality), yellow (average), and red (lowest quality). <strong>Example:</strong> The access point sends out 10 beacons per second, so you would expect the client adapter to receive 50 beacon packets in 5 seconds. If it receives only 40 packets, the percentage of beacons received would be 80%. <strong>Range:</strong> 0 to 100% <strong>Note</strong> This parameter appears only if the Display in Percent check box is checked and the client adapter does not provide a signal quality value.</td>
</tr>
</tbody>
</table>
You can perform four functions from the AP Scan List tab:

- View the AP scan list, page F-9
- Pause the AP scan list, page F-11
- View AP details, page F-12
- Generate an AP scan log file, page F-14

Follow the instructions on the pages indicated to perform these functions.
Viewing the AP Scan List

Your client adapter can detect nearby access points by the beacon signals that the access points continually transmit. The AP scan list displays a continuously updated list of the access points detected by your client adapter as well as the information contained in their beacons.

To view the AP scan list, click the AP Scan List tab. The AP scan list appears (see Figure F-5).

Figure F-5  Site Survey Utility - AP Scan List

To view the entire list of access points and all their information, perform one of the following:

- Click the resize tab in the lower right corner of the main window and drag it until the window reaches the desired size.
- Use the vertical and horizontal scroll bars.
- Click the middle button in the top right corner of the window.

Table F-2 interprets the information that is displayed in the AP scan list.

Table F-2

<table>
<thead>
<tr>
<th>Network Name</th>
<th>MAC Address</th>
<th>RSSI</th>
<th>Data Enc.</th>
<th>Type</th>
<th>Ch (Freq.)</th>
<th>Max Rate</th>
<th>AP Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:08:FC:...</td>
<td>-32 Secure</td>
<td>G</td>
<td>1 (2412)</td>
<td>54</td>
<td>req01-2...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:07:85:B...</td>
<td>-65 Open</td>
<td>B</td>
<td>7 (2442)</td>
<td>11&quot;</td>
<td>AP108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:11:92:9...</td>
<td>-70 Open</td>
<td>A</td>
<td>52 (5200)</td>
<td>54</td>
<td>FRED...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:08:46:C...</td>
<td>-77 Secure</td>
<td>A</td>
<td>56 (5280)</td>
<td>54</td>
<td>AP108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:08:FC:...</td>
<td>-55 Secure</td>
<td>A</td>
<td>60 (5300)</td>
<td>54</td>
<td>FRED...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To view the entire list of access points and all their information, perform one of the following:

- Click the resize tab in the lower right corner of the main window and drag it until the window reaches the desired size.
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- Click the middle button in the top right corner of the window.

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Table F-2

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<th>RSSI</th>
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<th>Type</th>
<th>Ch (Freq.)</th>
<th>Max Rate</th>
<th>AP Name</th>
</tr>
</thead>
<tbody>
<tr>
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<td>G</td>
<td>1 (2412)</td>
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<td>req01-2...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:07:85:B...</td>
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<td>B</td>
<td>7 (2442)</td>
<td>11&quot;</td>
<td>AP108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:11:92:9...</td>
<td>-70 Open</td>
<td>A</td>
<td>52 (5200)</td>
<td>54</td>
<td>FRED...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:08:46:C...</td>
<td>-77 Secure</td>
<td>A</td>
<td>56 (5280)</td>
<td>54</td>
<td>AP108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:08:FC:...</td>
<td>-55 Secure</td>
<td>A</td>
<td>60 (5300)</td>
<td>54</td>
<td>FRED...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note

The AP Detailed Information window provides details for many of the parameters listed in Table F-2. See the “Viewing AP Details” section on page F-12 for additional information.
### Table F-2  Site Survey Utility - AP Scan List

<table>
<thead>
<tr>
<th>AP Scan List Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>The number of rows, or access points, in the scan list. <strong>Note</strong> This parameter appears above the AP scan list and to the left.</td>
</tr>
<tr>
<td>Network Name</td>
<td>The network name, or service set identifier (SSID), indicates the name of an available wireless network. The icon to the left of the SSID provides information on link status. <strong>Note</strong> The SSID of a Cisco IOS access point appears in the list of available networks only if a Guest Mode SSID is enabled or the Broadcast SSID in Beacon option is selected. Refer to the software configuration guide for your access point for additional information.</td>
</tr>
<tr>
<td>Icon</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>An available wireless network.</td>
</tr>
<tr>
<td></td>
<td>The wireless network to which your client adapter is currently associated. <strong>Note</strong> The SSID of a Cisco IOS access point appears in the list of available networks only if a Guest Mode SSID is enabled or the Broadcast SSID in Beacon option is selected. Refer to the software configuration guide for your access point for additional information.</td>
</tr>
<tr>
<td>MAC Address</td>
<td>The access point’s MAC address. <strong>Note</strong> This field displays the MAC address of the access point’s Ethernet port (for access points that do not run Cisco IOS software) or the MAC address of the access point’s radio (for access points that run Cisco IOS software). The MAC address of the Ethernet port on access points that run Cisco IOS software is printed on a label on the back of the device.</td>
</tr>
<tr>
<td>RSSI</td>
<td>The received signal strength indicator (RSSI) is a measure of signal strength in decibels with respect to milliwatts (dBm).</td>
</tr>
<tr>
<td>Data Encryption</td>
<td>Indicates whether the data exchanged with this access point is encrypted. <strong>Value</strong>: Secure or Open</td>
</tr>
<tr>
<td></td>
<td><strong>Value</strong></td>
</tr>
<tr>
<td></td>
<td>Secure</td>
</tr>
<tr>
<td></td>
<td>Open</td>
</tr>
<tr>
<td>Type</td>
<td>The IEEE 802.11 standard that describes the access point’s radio band. <strong>Value</strong>: A, B, or G</td>
</tr>
<tr>
<td>Channel (Frequency)</td>
<td>The channel and radio frequency that the access point is currently using for communications. <strong>Value</strong>: Dependent on radio band and regulatory domain</td>
</tr>
<tr>
<td>Max Rate</td>
<td>The maximum rate at which the access point can transmit data.</td>
</tr>
</tbody>
</table>
### Pausing the AP Scan List

The AP scan list is updated continually. To pause the current list, click **Pause List Update** above the AP scan list.

**Note**

Clicking this button again resumes the list update.

### Table F-2 Site Survey Utility - AP Scan List (continued)

<table>
<thead>
<tr>
<th>AP Scan List Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP Name</td>
<td>The access point’s name. It is shown only if the access point was configured with a name, Aironet Extensions are enabled (on access points running Cisco IOS Release 12.2(4)JA or later), and the access point transmits this information. <strong>Note</strong> This field shows up to 15 characters although the name of the access point may be longer.</td>
</tr>
<tr>
<td>CCX</td>
<td>The version of Cisco Compatible Extensions (CCX) supported by the access point. It is shown only if the access point transmits this information. <strong>Value:</strong> 1, 2, 3, or 4</td>
</tr>
<tr>
<td>Other Information</td>
<td>A list of miscellaneous values that may appear depending on the access point’s current status and the information that it transmits. <strong>Values:</strong> Ad-Hoc, Power, Qos, RM-Normal, RM-Source, and Ssidl</td>
</tr>
</tbody>
</table>

#### Value | Description
--- | ---
Ad-Hoc | Indicates that the device is not an access point but another client adapter operating in ad hoc mode.
Power | Indicates whether the access point can limit the transmitting power of the client adapter. If so, the power limit is also shown in milliwatts (mW).
Qos | Indicates whether the access point is using quality of service (QoS). QoS on wireless LANs (WLAN) provides prioritization of traffic from the access point over the WLAN based on traffic classification.
RM-Normal | Indicates whether the access point is using radio management. If so, a value of 1 indicates normal status, 2 indicates AP radio scan, and 3 indicates client walkabout. Any other value appears as RM-State:xxx, where xxx represents a numerical value.
RM-Source | Indicates whether the access point is using radio management extensions and displays the MAC address of the radio management source (for example, RM-Source: 00-07-85-B4-04-9F).
Ssidl | Indicates the number of advertised alternate SSIDs (for example, Ssidl:2).
**Viewing AP Details**

To view details for a particular access point in the AP scan list, select the desired network name in the scan list and click **View AP Details**. The AP Detailed Information window appears (see Figure F-6).

You can also open the AP Detailed Information window by double-clicking in the first column of the desired row.

---

**Table F-3** interprets the information that is displayed in the AP Detailed Information window.

---

The AP Detailed Information window contains text summaries of all the information elements present in the access point’s beacon or probe response. As a result, the window may contain different information than that described in **Table F-3**.

---

**Table F-3**  
**Site Survey Utility - AP Detailed Information**

<table>
<thead>
<tr>
<th>Detailed Information Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSID</td>
<td>The network name, or service set identifier (SSID), indicates the name of the access point’s wireless network.</td>
</tr>
<tr>
<td>MAC Address</td>
<td>The access point’s MAC address. <strong>Note</strong> This field displays the MAC address of the access point’s Ethernet port (for access points that do not run Cisco IOS software) or the MAC address of the access point’s radio (for access points that run Cisco IOS software). The MAC address of the Ethernet port on access points that run Cisco IOS software is printed on a label on the back of the device.</td>
</tr>
</tbody>
</table>
### Table F-3  Site Survey Utility - AP Detailed Information (continued)

<table>
<thead>
<tr>
<th>Detailed Information Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSSI</td>
<td>The received signal strength indicator (RSSI) is a measure of signal strength in decibels with respect to milliwatts (dBm).</td>
</tr>
</tbody>
</table>
| Data Encryption                | Indicates whether the data exchanged with this access point is encrypted.  
                                  **Value:** Secure or Open |
| Infrastructure Mode            | Indicates whether the device is an access point operating in infrastructure mode or another client adapter operating in ad hoc mode.  
                                  **Value:** Infrastructure or Ad-Hoc |
| Network Type                   | The IEEE 802.11 standard that describes the access point’s radio band.  
                                  **Value:** A, B, or G |
| Supported Rates                | The rate at which the access point is capable of transmitting and receiving data packets.  
                                  **Value:** 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54 Mbps |
| Channel (Frequency)            | The channel and radio frequency that the access point is currently using for communications.  
                                  **Value:** Dependent on radio band and regulatory domain |
| Beacon Period                  | The amount of time between access point beacons in Kilomicroseconds (Kµsec).  
                                  **Note** One Kµsec equals 1,024 microseconds. |
| ATIMWindow                     | Announcement traffic information message (ATIM) window. The brief time period immediately following the transmission of each beacon in an ad hoc network. This value is expressed in Kilomicroseconds (Kµsec).  
                                  **Note** One Kµsec equals 1,024 microseconds.  
                                  **Note** This parameter’s value is 0 when the device is operating in infrastructure mode. |
| DSConfig                       | The frequency of the selected channel.  
                                  **Range:** 2,412,000 to 2,484,000 kHz (802.11b/g);  
                                  5,000,000 to 6,000,000 kHz (802.11a) |
| HopPattern                     | The hop pattern used to determine the hop sequence. |
| HopSet                         | A set of patterns used to determine the hop sequence. |
| DwellTime                      | The maximum amount of time that the access point should remain on a channel. This value is expressed in Kilomicroseconds (Kµsec).  
                                  **Note** One Kµsec equals 1,024 microseconds. |
| Name                           | The access point’s name. It is shown only if the access point was configured with a name, Aironet Extensions are enabled (on access points running Cisco IOS Release 12.2(4)JA or later), and the access point transmits this information.  
                                  **Note** This field shows up to 15 characters although the name of the access point may be longer. |
Appendix F    Performing a Site Survey

Generating an AP Scan Log File

To enter the current contents of the AP scan list into a log file that can be saved to your computer's hard drive, click **Log Snapshot**. The "Logged current AP Scan List" message appears below the scan list, and the log file is saved as a text file in the same directory as the site survey utility. The default location is C:\Program Files\Cisco Aironet (unless you specified a different location during installation).

**Note**
If the AP scan list is paused when you click Log Snapshot, the currently displayed data (not the latest available data) is added to the log.

**Note**
Each time you click **Log Snapshot**, the new scan list is written at the end of the existing log file.

To view the log file, find and open the file (SST_APScanLog.txt) using Windows Explorer. The log file appears (see **Figure F-7**).

**Note**
The log file can be viewed by a spreadsheet or database program (such as Microsoft Excel). It is written in comma-separated values (CSV) format. Therefore, if the file is renamed with a .csv extension, Microsoft Excel would automatically place the values in separate columns.

**Figure F-7** Site Survey Utility - Log File

The log entries are time-stamped and appear in ASCII text. Each line represents a different access point.
Finding the Version of the Site Survey Utility

To find the current version of the site survey utility, choose About from the Help drop-down menu. The About window appears (see Figure F-8).

Figure F-8  Site Survey Utility - About Window

Accessing Online Help

To access the site survey utility’s online help, choose Contents from the Help drop-down menu.

Exiting the Site Survey Utility

To exit the site survey utility, perform one of the following:
- Click the X in the top right corner of the main window.
- Choose Exit from the Action drop-down menu.

Uninstalling the Site Survey Utility

Uninstalling the client adapter software also uninstalls the site survey utility. Refer to the “Uninstalling the Client Adapter Software” section on page 9-6 for instructions.
Appendix F      Performing a Site Survey

Uninstalling the Site Survey Utility