Wireless Site Survey FAQ

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Related Information

Introduction

This document provides information on the most frequently asked questions (FAQ) about a Wireless Site Survey.

Q. What is a site survey?

A. A radio frequency (RF) site survey is the first step in the deployment of a Wireless network and the most important step to ensure desired operation. A site survey is a task−by−task process by which the surveyor studies the facility to understand the RF behavior, discovers RF coverage areas, checks for RF interference and determines the appropriate placement of Wireless devices.

Q. What is the need for Wireless Site Survey?

A. In a Wireless network, many issues can arise which can prevent the radio frequency (RF) signal from reaching all parts of the facility. Examples of RF issues include mulitpath distortion, hidden node problems, and near/far issues. In order to address these, you need to find the regions where these issues occur. A site survey helps you to do this. A site survey helps define the contours of RF coverage in a particular facility. It helps us to discover regions where mulitpath distortion can occur, areas where RF interference is high and find solutions to eliminate such issues. A site survey that determines the RF coverage area in a facility also helps to choose the number of Wireless devices that a firm needs to meet its business requirements.

Q. What are the design constraints that a proper site survey needs to address ?

A. The four main design requirements that need to be taken care of while a site survey is performed are:

1. High Availability
2. Scalability
3. Manageability
4. Interoperability

Q. What are the results of a Wireless site survey?

A. A proper site survey provides detailed information that addresses coverage, interference sources, equipment placement, power considerations and wiring requirements. The site survey documentation serves as a guide for network design and for the installation and verification of the Wireless communication infrastructure.

Q. What basic equipment is required for the completion of a site survey?

A. Some of the basic equipment and utilities that are required for the completion of a site survey include:

1. Wireless access point
2. Wireless client card
3. Laptop or PDAs
4. Variety of antennas (this depends on the requirement of the firm)
5. Site survey utility software

Q. What are the steps to perform a site survey?

A. A professional installer is needed for optimal results. These are the steps that are performed:

1. Obtain a facility diagram in order to identify the potential radio frequency (RF) obstacles.
2. Visually inspect the facility to look for potential barriers or the propagation of RF signals and identify metal racks.
3. Identify user areas that are highly used and the ones that are not used.
4. Determine preliminary access point (AP) locations. These locations include the power and wired network access, cell coverage and overlap, channel selection, and mounting locations and antenna.
5. Perform the actual surveying in order to verify the AP location. Make sure to use the same AP model for the survey that is used in production. While the survey is performed, relocate APs as needed and re−test.
6. Document the findings. Record the locations and log of signal readings as well as data rates at outer boundaries.

Q. What are National Electronics Manufacturers Association (NEMA) enclosures?

A. Sometimes access points (APs) are located in areas where they are subject to extreme moisture, temperatures, dust and particles. These APs might need to be mounted inside a sealed enclosure. The NEMA has a rating system for these enclosures, which are generally called NEMA enclosures.

Q. What is the function of the Aironet Client Utility (ACU) Site Survey tool?

A. The ACU Site Survey tool can assist you in conducting a site survey. The tool operates at the radio frequency (RF) level and is used to determine the best placement and coverage (overlap) for the infrastructure devices of your network. The current status of the network is read from the client adapter and displayed 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).

Q. What are the two modes in which the Aironet Client Utility (ACU) Site Survey tool can be used?

A. The ACU Site Survey tool can operate in two modes.

- Passive mode
- Active mode

In passive mode, the tool does not initiate any RF traffic to understand RF behavior. Instead, it listens to the traffic that the client adapter hears and displays the results. Refer to Using Passive Mode for more information on how to use the ACU Site Survey tool in passive mode.

In active mode, the client adapter actively sends and receives low−level RF packets to or from its associated access point and provides information on the success rate. It also enables you to set parameters that govern how the site survey is performed (such as the data rate). Refer to Using Active Mode for more information about how to use the ACU Site Survey tool in active mode.

Q. What is the use of the Link Status Meter (LSM) utility on the Aironet Client Utility (ACU)?

A. The LSM utility is used to determine the performance of the radio frequency (RF) link between the client adapter and its associated access point (AP). The information on the LSM can be used to determine the optimum number and placement of the APs in the RF network. By using the LSM to assess the RF link at various locations, you can avoid areas of weak performance and eliminate the risk of losing the connection between the client adapter and the AP.

Q. What are the guidelines to follow when you perform a site survey using the Aironet Client Utility (ACU) Site Survey tool?

A. Follow these guidelines when you use the ACU Site Survey tool:

1. Perform the site survey when the radio frequency (RF) link functions with all other systems and noise sources are operational.
2. Execute the site survey entirely from the mobile station.
3. Conduct the site survey with all variables set to operational values when active mode is used.

Q. Is there a Site Survey tool available with the Aironet Desktop Utility (ADU). I use a CB21AG Wireless card and I do not see a Site Survey tool in the ADU?

A. The Site Survey tool is available with ADU release 2.0 and later. The older releases of the ADU do not come with the Site Survey tool. Check your ADU release. If you use an older version of ADU, upgrade the ADU to the latest release. The latest release of the client adapter firmware and utilities are located on the Wireless downloads (registered customers only) page.

Q. I have installed the latest release of the Aironet Desktop Utility (ADU) from Cisco.com. But I am not able to find the Site Survey tool in the ADU?

A. The Site Survey tool is installed only if you check **Install Site Survey Utility** during the installation of the client adapter software. If you did not check this and want to use the Site Survey tool, uninstall the client adapter software, reinstall it, and make sure to check **Install Site Survey Utility**.

Q. Where can I find documents which explain in detail how to use the Site Survey tool available on the Aironet Client Desktop (ADU) and Aironet Client Utility (ACU)?

A. Refer to the Performing a Site Survey section of the *Cisco Aironet 802.11a/b/g Wireless LAN Client Adapters (CB21AG and PI21AG) Installation and Configuration Guide* to use the Aironet Desktop Utility (ADU) Site Survey tool.

Refer to the Performing a Site Survey section of *Cisco Aironet 340, 350, and CB20A Wireless LAN Client Adapters Installation and Configuration Guide for Windows* to use the Aironet Client Utility (ACU) Site Survey tool.

Q. Can I perform a site survey using Cisco Aironet 1131 and 1242 access points and then use the results to deploy an Airespace Wireless solution?

A. Yes, you can do this as long as a proper site survey is conducted and the results yield an effective Wireless solution. In this case, you can use any site survey tool.

Q. Can I use the Aironet Client Utility (ACU) and Aironet Desktop Utility (ADU) Site Survey tools to perform a complete site survey?

A. The site survey tool that comes with the Aironet Client Utility (ACU) and the Aironet Desktop Utility (ADU) only assist in a site survey. Do not use these tools for a complete site survey. The site survey should be done by professional installers and there are many other tools that they use to perform the professional site survey. The ACU/ADU site survey tool is not intended to replace the professional site survey engineers.

Q. Can I use a 802.11b client card to do a site survey for a 802.11g access point?

A. The 802.11b radio can be used to conduct the site survey with the 802.11g radios. However, use the 802.11g cards to do the site survey in order to do a more complete site survey specific to the 802.11g radio.

Q. I have to install Cisco Aironet 1242 access point (AP) in our office. Can I use AP 1232 for site survey?

A. Cisco recommends to use the same AP for site survey and installation. This is because the range of two APs is different. If you do the site survey with one type of AP and install a different type, then the range differs. Refer to Cisco Aironet 1230AG Series 802.11A/B/G Access Point Data Sheet and Cisco Aironet 1240AG Series 802.11A/B/G Access Point Data Sheet for more information.

Q. I need to measure the coverage for an Aironet 1210 access point and want to use the Aironet Desktop Utility (ADU) Site Survey tool on a laptop. However, I cannot prevent the laptop from roaming to another access point before I can find the edge of coverage for the target access point. Is there a way to prevent the laptop from roaming from the target access point so I can find the extent of coverage? I set the "Preferred AP" in the ADU, but that does not prevent roaming?

A. Create a test SSID on the target access point (AP) and the client. This SSID should not exist on the other APs in the Wireless network. With this SSID you can measure the extent of coverage. The client does not roam to other APs since the test SSID does not exist on any other AP except the AP for which you measure the coverage. Once you are done with this you can disable the test SSID on the AP and activate the production SSID.

Q. Does the procedure for a site survey change if there are voice−based applications in a Wireless LAN (WLAN) network?

A. With the introduction of voice to a predominantly wireless data network, the methodology of site surveys needs to be altered. Surveying for Wireless voice coverage requires more effort and time than for data−only coverage at the same site. A voice survey requires planning of coverage plus the planning of capacity. Wireless data is less susceptible to disruption than Wireless voice when it comes to cell overlap, radio frequency (RF) noise, and packet delay. Refer to Recommendations for Successful VoIP Surveys for more information on how to perform a site survey for voice based WLAN.

Q. What are the different types of voice site surveys that Cisco recommends?

A. There are two types of Wireless LAN (WLAN) Voice over IP (VoIP) surveys:

- A survey performed with Wireless IP Telephony (WIPT) handsets
- A survey that simulates WIPT operation

Refer to Conducting a WIPT Survey for more information on conducting Wireless LAN VoIP site surveys.

Q. What are the possible sources of radio frequency (RF) interference that one has to look for when conducting a site survey?

A. WLAN interference can be generated by microwave ovens, 2.4 GHz cordless phones, Bluetooth devices, or other electronic equipment that operates in the 2.4 GHz band. Interference also typically comes from other access points (APs) and client devices that belong in the WLAN but that are far enough away so that their signal is weakened or has become corrupted. APs that are not part of the network infrastructure can also cause WLAN interference and are identified as rogue APs. When a site survey is performed, these devices have to be identified and have to be eliminated.

Q. I have a Wireless LAN Solution Engine (WLSE). Can I use this to perform a site survey?

A. You can use the Assisted Site Survey tool and the Automated Resite Surveys tool to do a site survey using the WLSE. Refer to Using the Location Manager Assisted Site Survey Wizard for information on how to use the Assisted Site Survey tool to perform the site survey.

Refer to Understanding Auto Re−Site Survey for information on how to use the Automated Re−Site Survey tool.

Q. Do I need to configure Wireless Domain Services (WDS) on the Wireless LAN Solution Engine (WLSE) to do a site survey?

A. Yes, only members of WDS can be involved in a site survey using the WLSE. WDS needs to be operational for all of the Radio Management capabilities of the WLSE. This includes radio coverage and rogue detection to work. Refer to Setting up the WDS for information on how to setup WDS.

Q. What is channel utilization?

A. Channel utilization is the amount of time that the channel is unavailable or is being used. A given AP can have no clients attached, minimal transmit time, and minimum receive time (yet have significant channel utilization). The channel is shared by every AP on the same channel both ours and neighboring networks. It can also be elevated by non wi−fi interference.

Q. What is the recommended or minimum Single−to−Noise ratio for different environments?

A. This table lists the minimum Signal−to−Noise ratio values for the voice and data cells.

Data Rate (Mbps)	Data Cell		WIPT Cell	
	Minimum Cell Edge Signal Strength	Minimum SNR	Minimum Cell Edge Signal Strength	Minimum SNR
54	-71	25	—	—
36	-73	18	—	—
24	-77	12	—	—
12 or 11	-82	10	-67	25
6 or 5.5	-89	8	-74	23
2	-91	6	-76	21
1	-94	4	-79	19

For detailed information about SNR, RSSI, and EIRP, refer to SNR, RSSI, EIRP and Free Space Path Loss .

Q. I use the Cisco a/b/g wi−fi card (CB21AG) and it uses the latest driver. I use the Aironet Site Survey Utility. Under the access point (AP) Scan List tab, I see a couple of APs that do not have a network name (for example, SSID), but that do have an AP name. What is the AP name

information? Why can I see the AP name but not the SSID? This appears to be on a couple of APs that are secure and that are 802.11b. Is this information relayed only when Aironet extensions are used?

A. AP Name is the hostname for the AP. It is shown on site survey outputs only if Aironet Extensions are enabled on the AP. The SSID (Network Name) of an AP appears in the list of available networks only if a Guest Mode SSID is enabled or the Broadcast SSID in Beacon option is selected in the AP.

Q. What is meant by Pico Cell Mode functionality and how does it optimize performance in a WLAN environment?

A. A Pico Cell is a small area of wireless provisioning provided by an antenna, which allows for a dense high−bandwidth deployment for installations such as stock exchanges. Pico Cell wireless configurations require a specific supplicant to function correctly with Pico Cell environments. Off−the−shelf laptop supplicants are not supported. If you have many APs in close proximity, this Pico Cell mode optimizes the controllers for small wireless cells.

Note: Do not attempt to configure Pico Cell functionality within your WLAN without consulting your sales team. Non−standard installation is not supported.

Refer to Pico Cell Functionality for more information.

Q. What is Signal−to−Noise Ratio (SNR)?

A. SNR is an electrical engineering concept defined as the ratio of a given transmitted signal to the background noise of the transmission media. It is widely used in the wireless environment and usually referred to as a power ration between a signal and background noise.

SNR = P(Signal)/P(Noise)

SNRs are usually expressed in terms of the logarithmic decibel scale. In decibels, the SNR is 20 times the base−10 logarithm of the amplitude ratio, or 10 times the logarithm of the power ratio.

$$\mathrm{SNR(dB)} = 10\log_{10}\left(\frac{P_{\mathrm{signal}}}{P_{\mathrm{noise}}}\right) = 20\log_{10}\left(\frac{A_{\mathrm{signal}}}{A_{\mathrm{noise}}}\right)$$

Q. Should I use the dynamic control features of Radio Resource Management (RRM) like Dynamic Channel Assignment (DCA) and Transmit Power Control (TPC) or should I use the static values that are given to me from a site survey? Does a problem occur if I use VoIP on wireless with the dynamic method (RRM)?

A. Typically, RRM focuses on power levels more than channel selection. It is very rare for RRM to change the channel of access points (APs) once all of the APs are deployed. However, it can react to neighboring interference and rotate all the channels if necessary.

For power, it is good if your phones, such as the 7920, support dynamic power management (DTPC). DTPC automatically takes care of the power and channel issue.

The initial survey is essential to get enough density for your needs, but after that let the controller do its job. The only possible exception is for outdoor, where the tendency is to do manual power due to the nature of sector antenna coverage. Refer to RRM for more information.

Q. I plan to deploy Cisco 7920 IP phones in a Cisco Unified Wireless Network. Are there any best practices or requirement guidelines to deploy this model of IP phones in order to achieve optimum performance?

A. Here are some of the important requirements to deploy 7920 IP phones in a Cisco Unified Wireless Network.

- The phone must run at least Software Version 3.01.
- The controller must run at least 3.2.116 or later.
- Dot11−phone compat and CAC limit must be "ON" in the WLAN.
- ARP unicast must be disabled under controller settings if 7921 phones are present.
- Aggressive load−balancing status must be disabled under controller settings.
- DHCP address assignment under the WLAN must be set for **NOT required**.
- If the controller tags packets, the Cisco switches require the native VLAN to be VLAN 1.
- If WMM is required in the voice VLAN for voice clients other than the Cisco Wireless IP Phone 7920, the WMM setting must be set to Allowed. Otherwise, it can be disabled.
- WLAN QOS must be set to **Platinum**.
- Mobility must be "ON" if the Cisco Unified Wireless has more than one WLC.
- The RF domain−name must be "ON" if the Cisco Unified Wireless has more than one WLC.
- Disable rates below 11M; 11M must be basic/mandatory and the others (higher ones) 'supported.'
- If you use EAP−FAST with the WLC, the 802.1x timeout is 2 seconds. This is not enough time for the 7920 to download and process the PAC. The timeout can be increased with the command: **config advanced eap request−timeout** *20* .
- **Peer−to−Peer blocking** must be **OFF** under the 'controller' tab, which is **off** by default.
- There must be at least 2 APs on non−overlapping channels within range of the phone with an RSSI of >35 and QBSS of <45.
- There must be at least one AP on overlapping channels within range of the phone with an RSSI of >35 and QBSS of <45.
- These values appear in the 7920 under the **Network > Site** survey in the form: channel, RSSI, channel−utilization.
- There must be no more than a 15−20% overlap in cell coverage.
- The AP placement must be such that there are no more than 10 calls per AP.

Refer to Cisco Unified Wireless IP Phone 7921G Deployment Guide to know about the prerequisites, as well as best practices to deploy**7921G phones** in a Cisco Unified Wireless Network.

Related Information

- **Radio Resource Management**
- **Performing a Site Survey**
- **Site Survey Guide: Deploying Cisco 7920 IP Phones**

- **Site Survey and RF Design Validation**
- **WLSE: Sites FAQs and Troubleshooting**
- **Wireless Support Page**
- **Technical Support & Documentation − Cisco Systems**

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