

WHITE PAPER

What Healthcare CIOs Need to Know about Wireless Networks

February 2006



Executive Summary

Is your healthcare facility considering the possibility of using a wireless network? According to a recent survey from the Healthcare and Information Management System Society (HIMSS), 53 percent of respondents indicated they are either implementing a wireless system or one is in the development plan for their organization. However, many network managers do not realize there are several crucial planning and design challenges unique to wireless networks and healthcare facilities that must be considered in order to deploy a secure, robust and productive network.

WLAN Security—Software Encryption Alone is Insufficient

Ensuring secure patient information is the most important concern for meeting Health Information Portability and Accountability Act (HIPAA) regulations. How can you guarantee the privacy of your healthcare facility's critical information when it is transmitted over a wireless local area network (WLAN)?

The security of a data network can only be compromised when it is accessible. In a traditional wired LAN, you must first plug into an Ethernet connection. In contrast, wireless networks rely on easily intercepted Radio Frequency (RF) transmissions. To secure a wireless network, software encryption is not enough—you must also physically secure your wireless signals by understanding where users may have access to the network.

Physically securing your wireless network requires that you know precisely where wireless coverage exists and that you have the ability to control that coverage. Because healthcare facilities contain large numbers of physical obstructions such as concrete and metal walls, wireless signal propagation is not uniform. Unfortunately, most approaches to planning WLANs do not take into account the effects of the physical environment on wireless coverage and thus cannot ensure that wireless signals are undetectable in insecure areas, such as the parking lot, waiting room, or the hospital lobby.

The optimal way to physically secure your wireless network is by using a WLAN planning solution that leverages an understanding of the construction of your facility.

This approach allows you to simulate and visualize how wireless coverage responds in your environment before deploying your network. As a result, you will know where to place access points (APs), visualize wireless coverage within the context of your facility and identify where anyone can intercept the signal. Furthermore, a “physically aware” WLAN planning solution allows you to adjust the APs to the most appropriate power levels, and ensures you are not extending wireless coverage into insecure locations.

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After you have physically secured your wireless network, you will need to add strong software encryption and deploy wireless equipment compliant with the latest security standards such as 802.11i, recently endorsed by IEEE. With these two steps, you will have ensured that your data is only accessible within allowed areas, and if the physical security of the network is compromised, the data is still encrypted.

The next most important healthcare WLAN design challenge is accounting for the high levels of electromagnetic interference typically found in healthcare facilities.

Planning for Interference is a Critical Aspect of WLAN Design

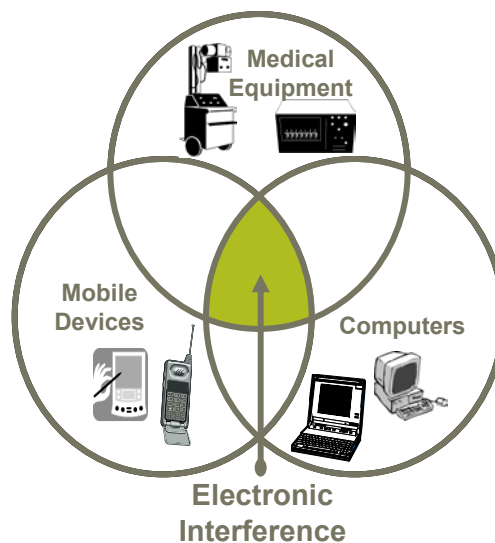
You have probably experienced disruptions in TV reception after turning on common household appliances like a mixer or vacuum cleaner. This same effect, caused by electromagnetic interference, impacts a wireless network by reducing coverage and degrading Quality of Service (QoS). Of course, healthcare facilities contain a large amount of medical equipment—all of which generate electromagnetic interference. As you add more equipment, the electronic interference increases. Unless you plan for this, your WLAN will not live up to the demanding expectations of your healthcare environment.

You can mitigate these effects by using a WLAN planning solution that allows you to model the various devices and their interference directly from the device specifications and simulate the results within the context of your facility. Even if you do not know where all the noise sources are, there are planning mechanisms that allow you to accurately represent the interference as an ambient noise floor with a specific power level and frequency. As a result, a wireless design that considers the impact of electromagnetic interference will overcome these challenges and provide the wireless coverage and robustness that your doctors, nurses and other staff require. The next healthcare WLAN design challenge to consider is planning for capacity.



Medical equipment generates electronic interference that impacts wireless signals.

Electronic Interference Impacts Wireless Signals.



WLAN Capacity—Number of Users and their Applications Drive Bandwidth Requirements

Wireless network usage within a healthcare environment goes beyond simple email and web browsing. Instead, applications such as wireless transmission of medical imagery, frequent updates of patient records and real-time monitoring of patient status requires that the WLAN meet the most demanding throughput requirements. Other wireless applications such as live remote assistance in the operating room, emergency pagers, and positioning/asset tracking may require “always on” connections and generate network traffic prioritization challenges.

How can you factor capacity and these demanding throughput requirements into the WLAN design process and guarantee the robust delivery and correct prioritization of critical applications?

Meeting your healthcare wireless capacity needs requires use of a WLAN planning solution that allows you to simulate network capacity based on the number of users, their locations and their application bandwidth requirements given the current AP placement and configuration.

Now, you can determine if your wireless network design can sustain high data rate applications and meet user requirements.

The only way to solve your unique WLAN design challenge is by using a network planning solution that leverages knowledge of the physical environment and the intended use of the network. Decades of research have led to the development of predictive techniques for simulating the context, coverage and capacity of wireless devices when physical environment data is available. These techniques are the most effective way of planning a healthcare wireless system that allows you to physically secure your network, mitigate interference and guarantee capacity.

For more information about Motorola’s Wireless Network Design software, visit www.motorola.com/enterprise.



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RO-10-2001

