Leverage the Software Integration in WiTuners WLAN Optimization Suite
Trouble-shooting and optimizing a complex wireless network in a large railway station using WiTuners

This case study showcases the power of integrating multiple Wi-Fi programs in WiTuners all-in-one WLAN Optimization Software Suite. Through jointly using various software in the suite, within a few hours, WiTuners has not only successfully identified the root cause of a persistent issue of poor Wi-Fi connection in a large railway station where a host of other Wi-Fi tools have been tried in vain, but has also provided a solution addressing the issue.

❖ Summary

A large railway station in Asia was experiencing a variety of customer complaints due to the poor wireless network in the passenger waiting area of the station. Passengers and visitors were reporting poor to no wireless signals, delays, and extremely slow wireless response. The visibility of this issue reached critical levels and executive concerns within the organizations of the railway station, the deployment contractor, and the WLAN hardware manufacturer.

▶ Challenges

They have tried all the Wi-Fi tools at their disposal for several months. All reported that the Wi-Fi signals are strong enough. None of the tools can tell what's really going wrong, let alone provide a solution. Users were complaining and the pressure was accumulating.

▶ Solution

WiTuners' solution is to jointly use various software in WiTuners all-in-one WLAN Optimization Suite to identify the causes of the issue and provide recommended optimization, without requiring any additional hardware or changing in wireless networks.

▶ Results

Within a few hours, WiTuners software suite has not only identified the root cause of the issue that all other tools failed to find, but has also provided a solution addressing the issue and optimizing the wireless networks with a 48% improvement in minimum per Access Point throughput.

❖ Background

Covering 486,000 square meters, this railway station is one of the four largest transportation hubs in the country. At the time of its construction, it was capable of handling 200,000 passengers per day. It consists of four floors and at approximately 84,000 square meters, the third floor is the waiting hall and commercial center of the station.

The third floor's initial WLAN plan and deployment implemented 44 access points by a major vendor that operated at 5GHz and used a dynamic channel plan. Post deployment surveys indicated that signal coverage appeared is fine. But the railway station has kept receiving complaints from passengers for losing Wi-Fi connections and slow Internet.

With the rising of complaints, a number of Wi-Fi tools at their disposal were employed to troubleshoot the issues, but none of them succeeded. It was suspected that it is perhaps the interference from a number of private commercial access points in the facility that has caused the poor performance and response times. But turning them off does not seem to mitigate the issue.

After a few months of trouble-shooting without any progress, WiTuners was brought in for help. Below are the steps that we took with various software in our WLAN optimization suite to identify and resolve the issue.

❖ Our Solution

▶ Analyze the Wireless Networks with WiTuners Planner

First of all, we checked the Wi-Fi coverage with WiTuners Planner after we loaded the train station's floor maps into WiTuners Planner and placed the APs at their locations on the floors. The Wi-Fi coverage looks good. Nearly all the area is green as shown in the snapshot, just as indicated by other tools.
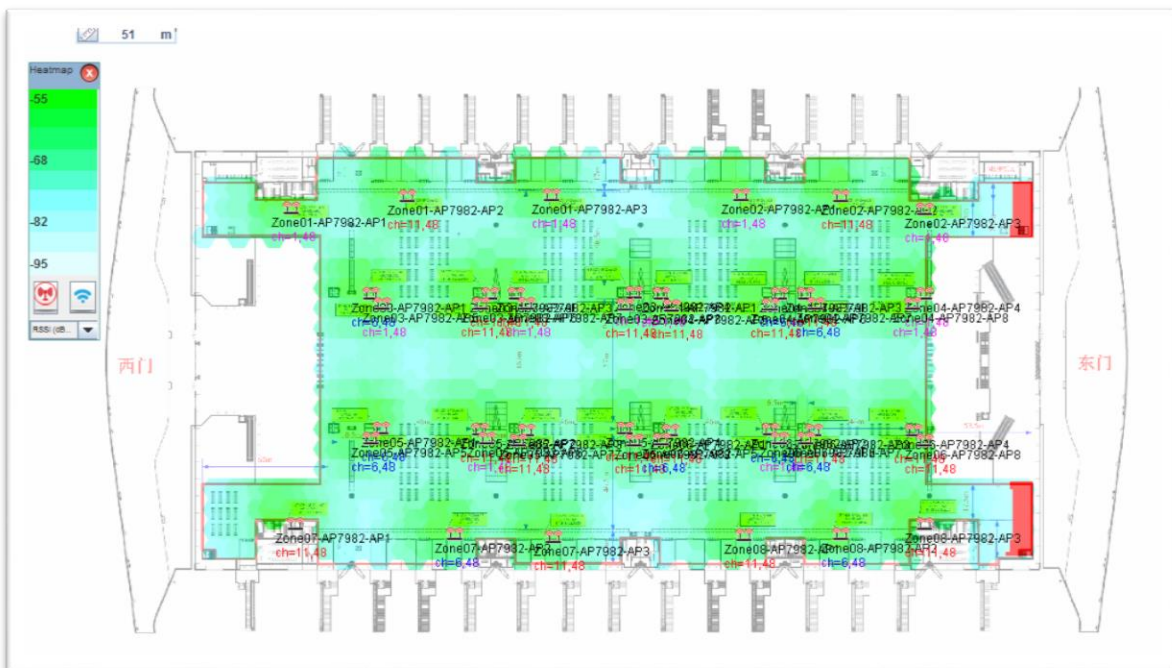
But wait, that's only for the downlink view, which shows the signals from APs to client devices. What about the

uplink view that shows the signals from client devices to APs?   Here it is:
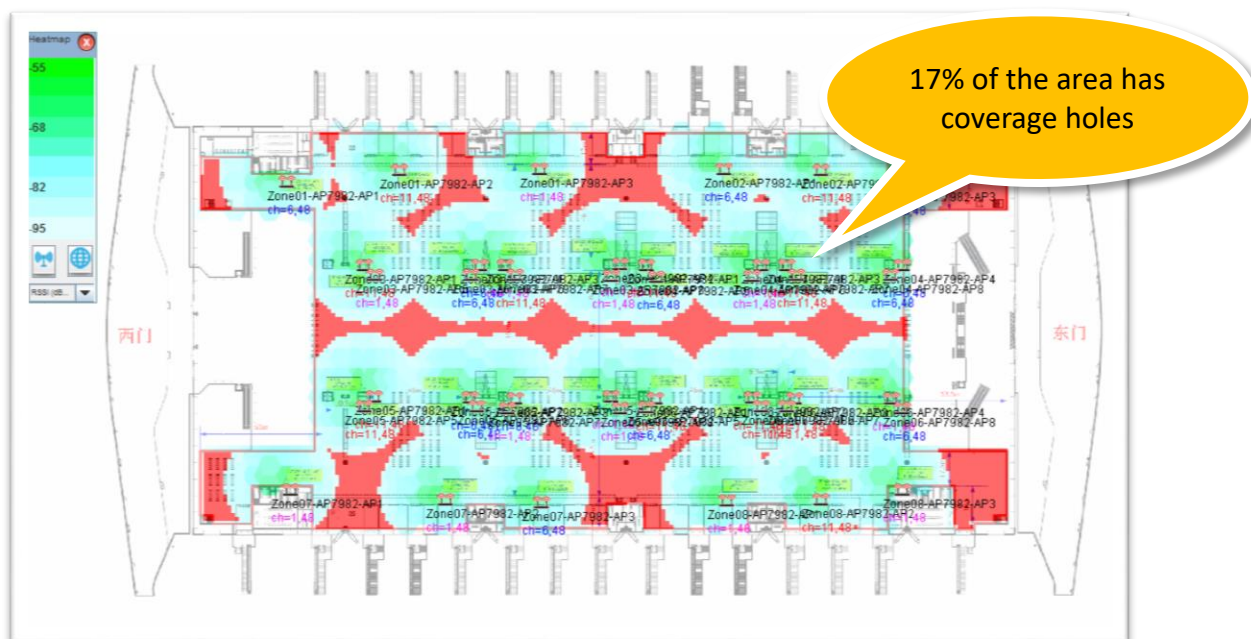
What? 17% of the area has coverage holes! No wonder. That's the issue!

Evidently, we saw a wireless network suffering from a classic case of asymmetric transmission power levels. The transmission power of the APs are much higher than those of client devices which leads to weak signals received by APs and causes many coverage holes on the uplink. No wonder other tools are unable to identify the cause. **They all only measure the signals from the APs to client devices**, not those from clients to APs!

Now that we have identified the cause with the predictive analysis capability of WiTuners Planner, we moved on to assess our findings in the real world wireless networks with other software in our WiTuners WLAN Optimization Suite.

▶ **Assess our findings using WiTuners Mobile and WiTuners Connected**

Unlike other tools that measures either only the downlink signals or only the uplink ones, our assessment measures both: the downlink is measured with WiTuners Mobile and the uplink with WiTuners Connected.

While an engineer was walking about in the train station to collect Site Survey data with WiTuners Mobile, another one was pulling the data of uplink signals from the wireless controller using WiTuners Connected at the same time. By the time both measurements were over, we got this very unique view that showed both the uplink and downlink Wi-Fi signals. The differences between the two clearly confirmed what we have found with WiTuners Planner. Yes, such an abundant amount of coverage holes in the uplink view indeed would result in poor connections as reported.
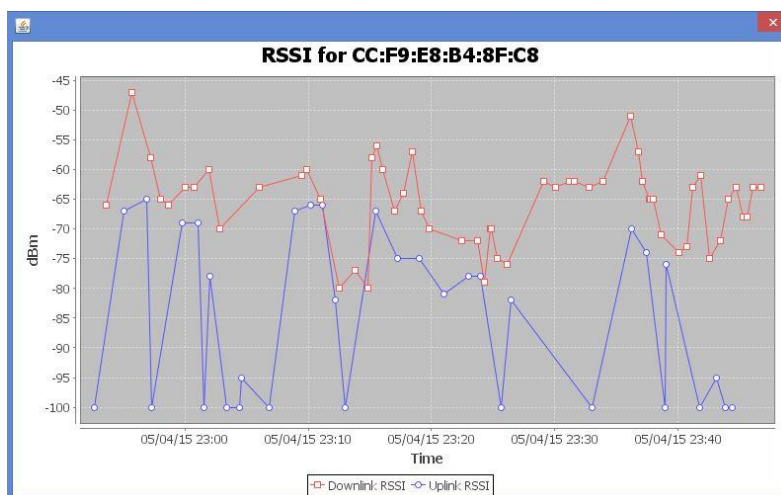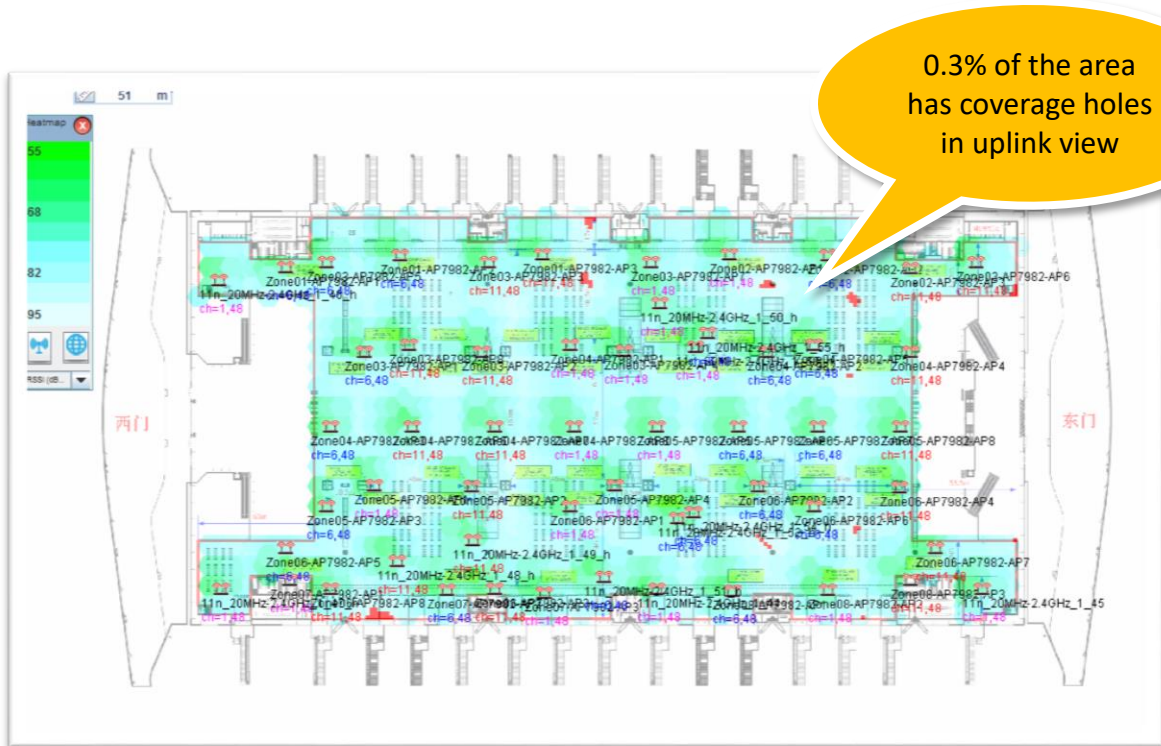
Solution for filling the coverage holes

Now that we have identified and assessed the root cause of the issue, we moved on to provide a solution with the Auto Planning capability of WiTuners Planner. With a few simple clicks, it created an improved Wi-Fi deployment for the existing wireless networks. It turned out that those coverage holes could be filled completely with 12 additional APs, whose optimal locations and properties were also provided. With the fix, one can see the coverage holes decreased from 17% to merely 0.3%.

A recomended plan has been generated by the Auto Planning Wizard

Auto-generated Plan
WARNING:
Your requirement of 1 Mbps per client is unable to meet, only 0.1 Mbps is guaranteed.

	Improvement	Current	Auto-generated Plan	Required
Coverage Hole %	17.4%	17.7%	0.3%	< 3%
# of APs		44	56	
minimum per AP throughput (Mbps)	0.7%	0.4	0.4	> 5
per AP calls	0.7%	1	1	> 2
overall system throughput (Mbps)	-0%	28.9	28.8	> 220
average throughput per AP (Mbps)	-0%	0.7	0.7	> 5
overall system calls	0%	72	72	> 88
average calls per AP	0%	1	1	> 2
QoS Score	-13%	65.5%	51.6%	> 70%

Keep Current Plan | Use Recommended Plan | Show Optimized Configs

0.3% of the area has coverage holes in uplink view

Further improvement with WLAN optimization

In order to optimize the performance of the wireless networks, we connected WiTuners On-Demand to the wireless controller for a one-time performance audit and tuning. With a few clicks, we got not only the current status of the WLAN, but also a set of recommended configurations for the APs that would lead to a 14.4% improvement in per AP throughput over their dynamic channel plan and a 48% improvement over their static channel plan.

❖ Results

In only a few short hours, WiTuners was successful in identifying the root cause of poor Wi-Fi connection at the train station, which has taken a few months without any progress using a host of other Wi-Fi tools. Better yet, the software has provided solutions addressing the issues.

By jointly using various pieces of software in the all-in-one WiTuners WLAN Optimization Suite, we demonstrated the unique capabilities of the industry's only solution for the complete lifecycle of a Wireless Local Area Network: WiTuners Mobile to collect downlink signals, WiTuners Connected to collect uplink signals, WiTuners Planner for predictive analysis and optimization solutions.

Unlike what has happened in this case study, we can in fact ensure that future performance issues and solutions are identified far prior to them becoming critical by implementing WiTuners Connected with real time auditing and tuning capabilities. As wireless LAN requirements and daily passenger numbers increase, WiTuners software provides the means necessary to monitor the WLAN performance and reduce the operational costs of managing such complex Wi-Fi environment.

If you would like to know more about WiTuners WLAN Optimization Suite, please visit the web site at http://www.wituners.com.