



Wi-Fi Servicing

Wi-Fi Survey- expectation document

Code: WFS

WFS- Mboneni Teledata Wi-Fi survey

The wireless site survey and RF analysis are performed in order to gain an in-depth understanding of **present RF interference sources and to meet overall wireless coverage requirements**. The primary goal and subsequent objectives are designed with coverage, desired throughput and usability as primary driving requirements. This survey is created using an industry standard set of Mboneni Wi-Fi Survey PRO wireless tools and software, which are used for building and securing wireless networks. **This survey encompasses site surveying, RF spectrum analysis surveying and real time active site surveying techniques**. The result includes site survey specific information, Access Point configuration and installation data sheets, and RF coverage pattern maps. A wireless survey is performed at the customer site.

Before we can conduct a design for your building please provide us with the following

- A **map of the building floor** you want us to survey
- A contact person in your company who has access to the building

The following will be included in the Survey report.

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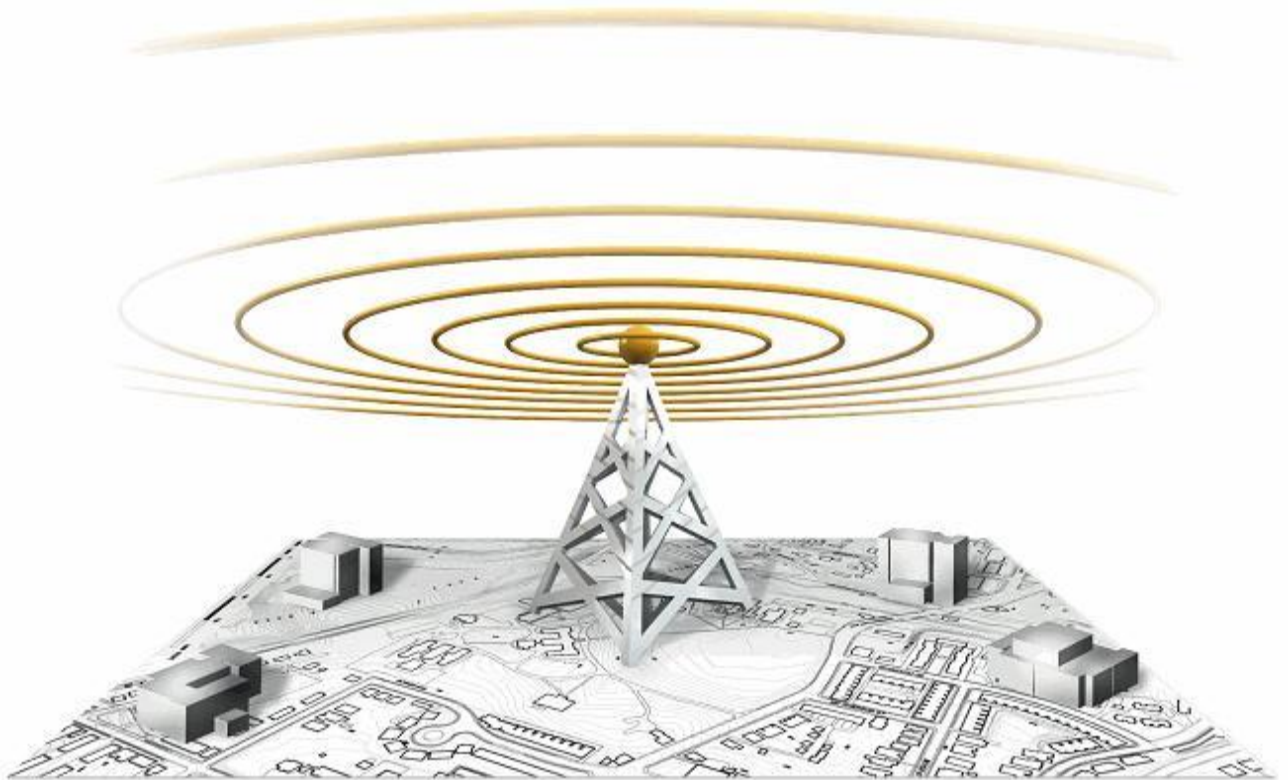
8.3. Noise Distribution

8.4. Signal/Noise Distribution

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Sample Report

Prepared for: SAMCO
Prepared by: Engineer 1
Location: Xxxx First Floor
Time of Survey: Monday, July 34, 2016 11:48:59 AM



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1 Executive Summary

This wireless site survey and RF analysis were performed in order to gain an in-depth understanding of present RF interference sources and to meet overall wireless coverage requirements. The primary goal and subsequent objectives were designed with coverage, desired throughput and usability as primary driving requirements from the business group. This survey was created using an industry standard set of Mboneni Wi-Fi Survey PRO wireless tools and software, which are used for building and securing wireless networks. This survey encompasses site surveying, RF spectrum analysis surveying and real time active site surveying techniques. This document includes site survey specific information, Access Point configuration and installation data sheets, and RF coverage pattern maps. A wireless survey was performed at the customer site. The purpose of the survey is to determine the number and placement of wireless access points necessary to provide ubiquitous coverage for the entire building.

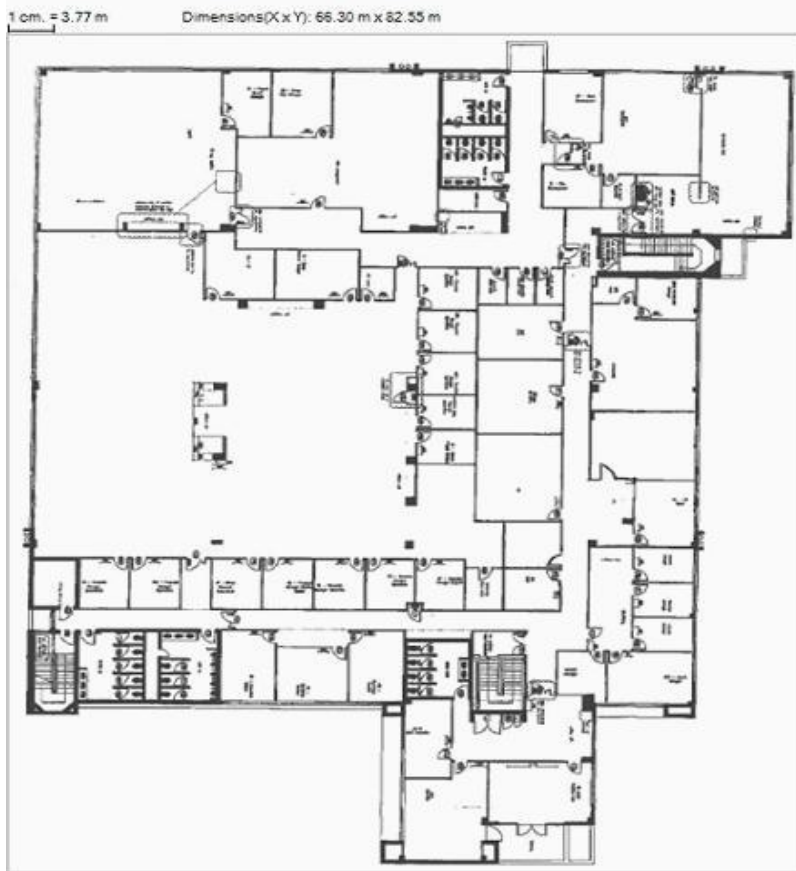
1.1 Survey Overview

1.1.1 Floor Plan Overview

The image below details the area that was surveyed. It includes the floor plan and the dimensions of the building. It can be useful to refer back to this view from some of the other graphs to help orient yourself.

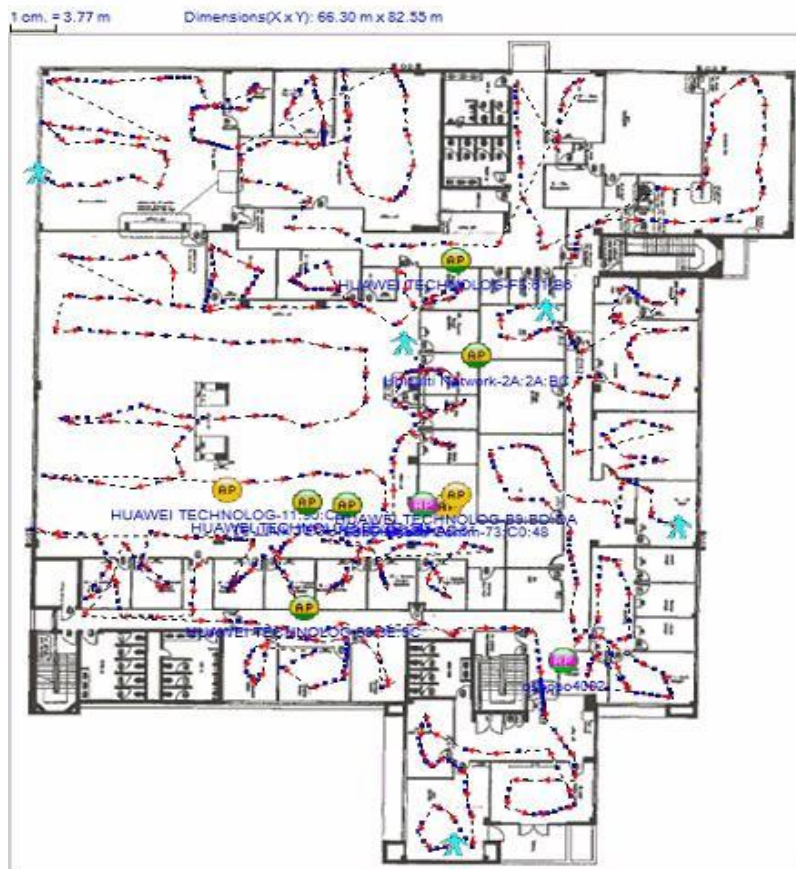
Dimensions

X	66.30 m
Y	82.55 m



1.1.2 Survey Path

This image displays the path taken during the survey process. The red dots indicate points that were clicked during the survey, whereas the blue ones represent sampling points taken by the application automatically.



2 Introduction

2.1 Objective

2.1.1 Pre-Install/Post-Install Survey-Checkup

The stated objective of this survey is to perform a spot-check of the existing deployment in order to establish that the current wireless infrastructure meets the needs of the users present. The requirements against which these results will be compared are stated in the WLAN Deployment Requirements section detailed later in this report.

3 Methodology

Multiple surveys were performed to allow finer detail and comprehensive data gathering. The process used to determine the existing RF data coverage in the facility is outlined below:

- Passive surveys were conducted throughout the facility to gather RF data (signal strength, noise level, signal-to-noise ratio, SSID and MAC addresses)
- Active Surveys were conducted throughout the facility. This was done to test performance and the roaming and connectivity ability of the Wi-Fi Network.

4 WLAN Deployment Requirements

This section documents the user's stated requirements for satisfactory wireless service in the region being surveyed. Note that these values can differ from site to site.

4.1 Deployment Requirements

Description	Threshold
<i>Desired Signal Coverage</i>	
Minimum AP signal strength required	-67 dBm
<i>Multiple AP Signal Coverage</i>	
Number of APs required to provide coverage	2
Minimum AP signal strength required to provide coverage	-67 dBm
<i>Channel Interference</i>	
Interfered APs: Exclude APs if signal strength is weaker than	-75 dBm
Interfering APs: Exclude APs if signal strength is weaker than	-85 dBm
<i>Measured PHY Data Rate Uplink Coverage</i>	
Minimum AP PHY Data Rate required	5.50 Mbps
<i>Measured PHY Data Rate Downlink Coverage</i>	
Minimum AP PHY Data Rate required	54.00 Mbps
<i>Predictive PHY Data Rate Downlink Coverage</i>	
Minimum AP PHY Data Rate required	54.00 Mbps
<i>Signal Noise Ratio Coverage</i>	

Mboneni Wireless Site Survey

Minimum Signal Noise Ratio required	25 dBm
<i>Noise Level</i>	
Maximum Noise Level Allowed	-90 dBm
<i>User Capacity</i>	
Maximum Users Supported per AP	15
With Load Balancing	True
<i>Operating Mode</i>	
Greenfield Operating Mode	Allowed
HT Mixed Operating Mode	Not Allowed
VHT Mixed Operating Mode	Allowed
Legacy Operating Mode	Not Allowed
<i>Channel Width</i>	
40 MHz Channel Width	Allowed
20HT MHz Channel Width	Not Allowed
20 MHz Legacy Channel Width	Not Allowed
80 MHz Channel Width	Allowed
160 MHz Channel Width	Allowed
<i>802.11n Highest MCS Index</i>	
Minimum Tx MCS index required	15
<i>802.11ac Highest MCS Index</i>	
Minimum Tx MCS index required	9

5 Current AP Placement and Configuration

The floor plan below shows the locations of the currently installed APs or desired if this is a new deployment. The specific details for each AP are described in the section labeled "AP Detail Breakdown".

Note: Only the AP's that were placed on the floor plan prior to running the report will be shown on the floor plan image.

5.2 AP Detail Breakdown

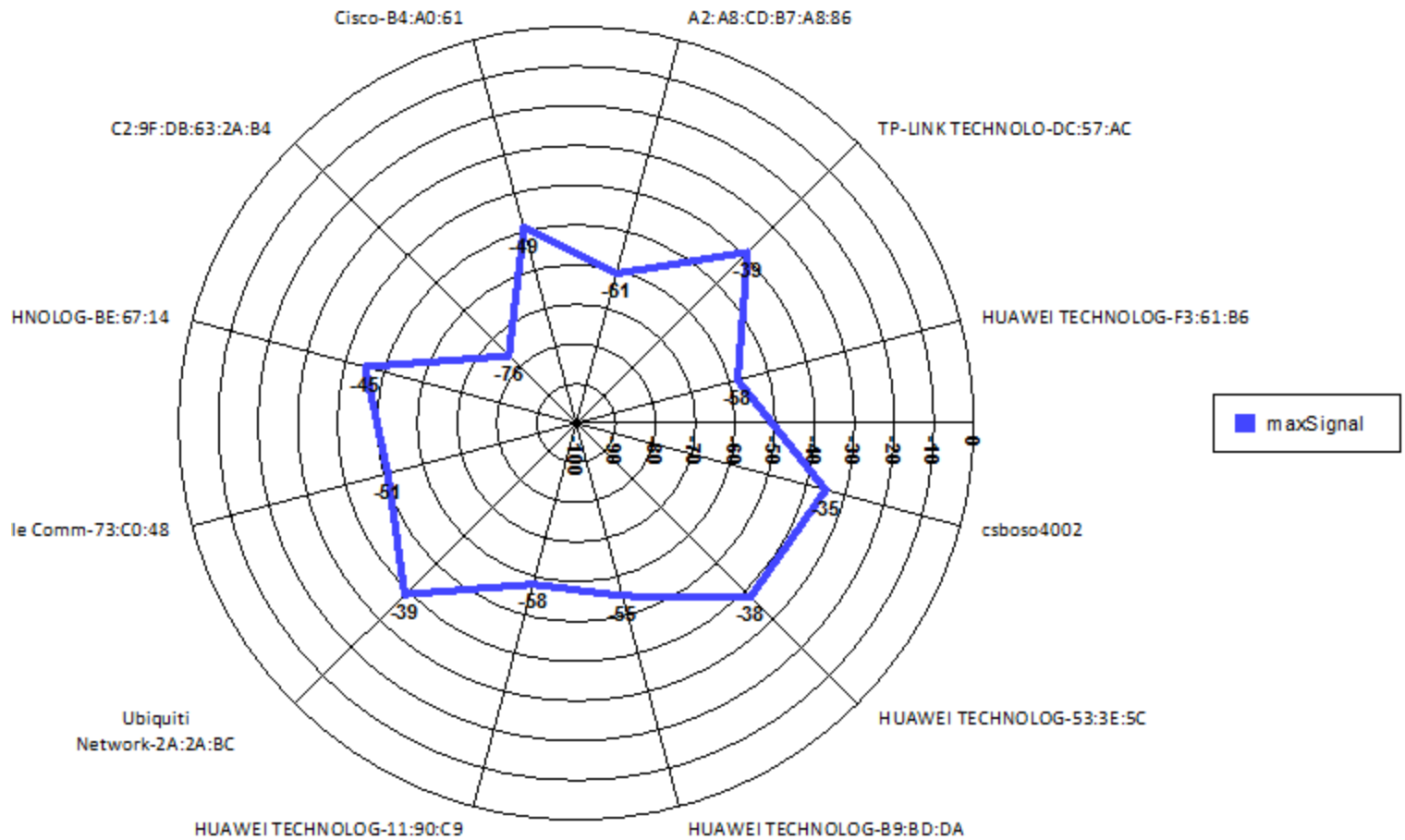
Access Points

AP Name	Media Type	MAC Address	Channel	SSID	Power,mW	Max Signal
---- Non ACL, Neighbors, Rogues ----						
Cisco-B4:A0:61	802.11g-2.4 GHz	00:26:CA:B4:A0:60	CH (4)	Samco_SmartDevi	100	-49
csboso4002	802.11g-2.4 GHz	00:26:CA:B4:CB:00	CH (13)	ces Samco_SmartDevi	100	-35
A2:A8:CD:B7:A8:86	802.11gn-2.4 GHz	A2:A8:CD:B7:A8:86	CH (4)	ces Virtual	100	-61
C2:9F:DB:63:2A:B4	802.11gn-2.4 GHz	C2:9F:DB:63:2A:B4	CH (6)	Freeway	100	-76
HUAWEI TECHNOLOG-11:90: C9	802.11gn-2.4 GHz	80:13:82:11:90:C9	CH (10)	HUAWEI-E5330-90C 9	100	-58
HUAWEI TECHNOLOG-53:3E: 5C	802.11gn-2.4 GHz	E8:08:8B:53:3E:5C	CH (11)	VodafoneMobileWiFi- 3E5C55	100	-38
HUAWEI TECHNOLOG-B9:BD :DA	802.11gn-2.4 GHz	AC:CF:85:B9:BD:DA	CH (10)	VodafoneMobileWiFi- BDDA31	100	-55
HUAWEI TECHNOLOG-BE:67: 14	802.11gn-2.4 GHz	3C:DF:BD:BE:67:14	CH (6)	Chris	100	-45
HUAWEI TECHNOLOG-F3:61: B6	802.11gn-2.4 GHz	78:6A:89:F3:61:B6	CH (1)	HUAWEI-E5220-61b 6	100	-58
Sony Mobile Comm-73:C0:48	802.11gn-2.4 GHz	84:8E:DF:73:C0:48	CH (6)	Xperia Z3_dad2	100	-51
TP-LINK TECHNOLO-DC:57:A C	802.11gn-2.4 GHz	90:F6:52:DC:57:AC	CH (1,1)	Ogilvy Printer	100	-39
Ubiquiti Network-2A:2A:BC	802.11gn-2.4 GHz	00:27:22:2A:2A:BC	CH (9)	Office	100	-39

Number of AP 12

Total APs 12

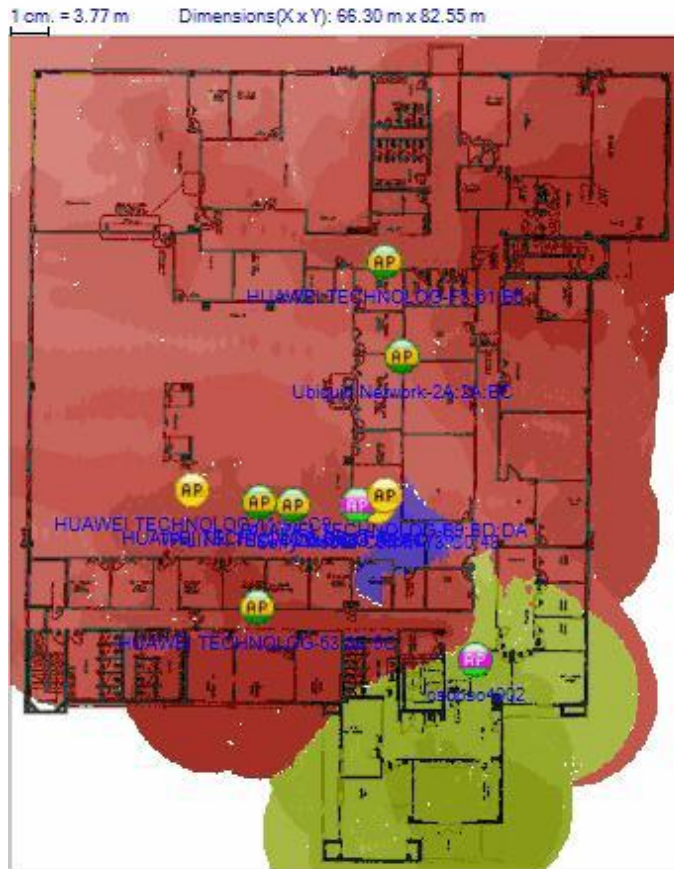
AP Signal Strength (dBm)



6 Current Deployment Site Survey

6.1 Access Point Coverage Regions

The image below shows the areas covered by the access points (in dBm). The color shown represents the AP with the strongest signal in any given area. This map will give you a visual representation of the Wi-Fi coverage area for the AP's.



■ HUAWEI TECHNOLOG-F3:61:B6 [78:6A:89:F3:6	■ TP-LINK TECHNOLOG-DC:57:AC [90:F6:52:DC:57:AC
■ A2:A8:CD:B7:A8:86 [A2:A8:CD:B7:A8:86]	■ Cisco-B4:A0:61 [00:26:CA:B4:A0:60]
■ C2:9F:DB:63:2A:B4 [C2:9F:DB:63:2A:B4]	■ HUAWEI TECHNOLOG-BE:67:14 [3C:DF:BD:BE:67:1
■ Sony Mobile Comm-73:C0:48 [84:8E:DF:73:C0:4	■ Ubiquiti Network-2A:2A:BC [00:27:22:2A:2A:BC]
■ HUAWEI TECHNOLOG-11:90:C9 [80:13:82:11:9	■ HUAWEI TECHNOLOG-B9:BD:DA [AC:CF:85:B9:BD:I
■ HUAWEI TECHNOLOG-53:3E:5C [E8:08:8B:53:3	■ csboso4002 [00:26:CA:B4:CB:00]

6.2 Overall Signal Coverage

The image below displays the signal coverage (in dBm) at each point in the map layout. As a general rule, regions with signal levels below -67 dBm provide insufficient coverage for standard use (this value may vary depending on user requirements, service level agreements, applications used, number of users serviced, etc.).

APs are displayed in their detected locations (and reflect the existing power and antenna properties).

Note: An active Wi-Fi area can incorporate a variety of environmental factors that can vary throughout the day and may adversely affect RF coverage.

Note: Only the AP's that were placed on the floor plan prior to running the report will be shown on the floor plan image.



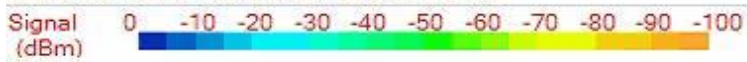
Individual Signal Distribution



HUAWEI TECHNOLOG-F3:61:B6 [CH (1), HUAWEI-E5220-61b6, -58]



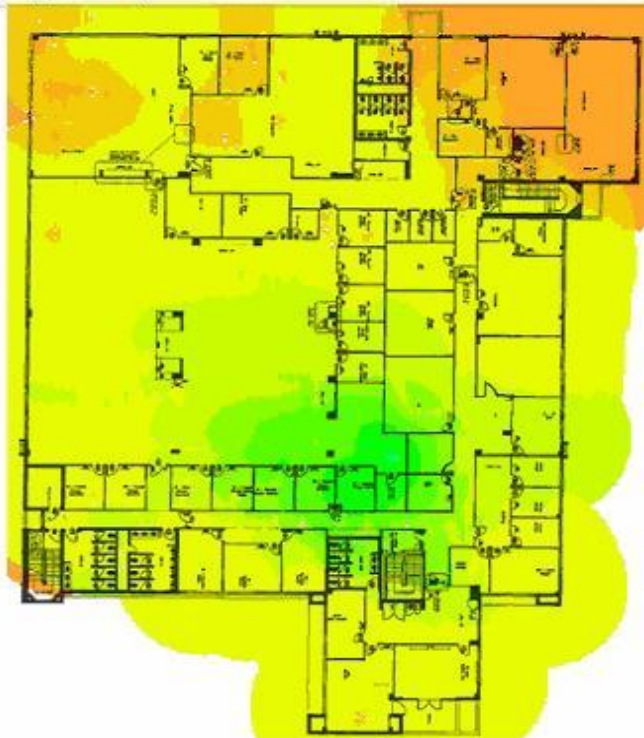
TP-LINK TECHNOLOG-DC:57:AC [CH (1), Ogilvy Printer, -39]



Individual Signal Distribution



A2:A8:CD:B7:A8:86 [CH (4), Virtual, -61]



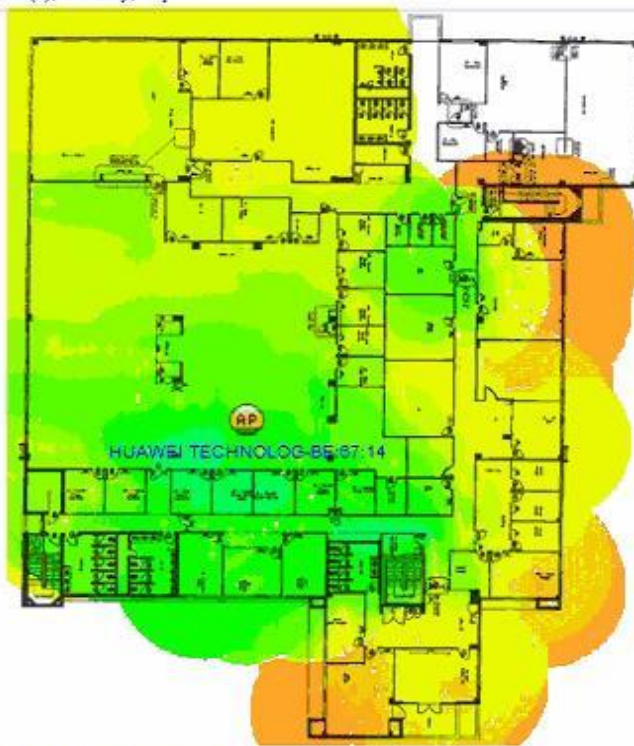
Cisco-B4:A0:61 [CH (4), Cashbuild_SmartDevices, -49]



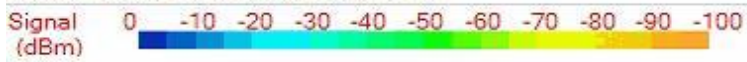
Individual Signal Distribution



C2:9F:DB:63:2A:B4 [CH (6), Freeway, -76]



HUAWEI TECHNOLOG-BE:67:14 [CH (6), Chris, -45]



Individual Signal Distribution



Sony Mobile Comm-73:C0:48 [CH (6),Xperia Z3_dad2,-51]



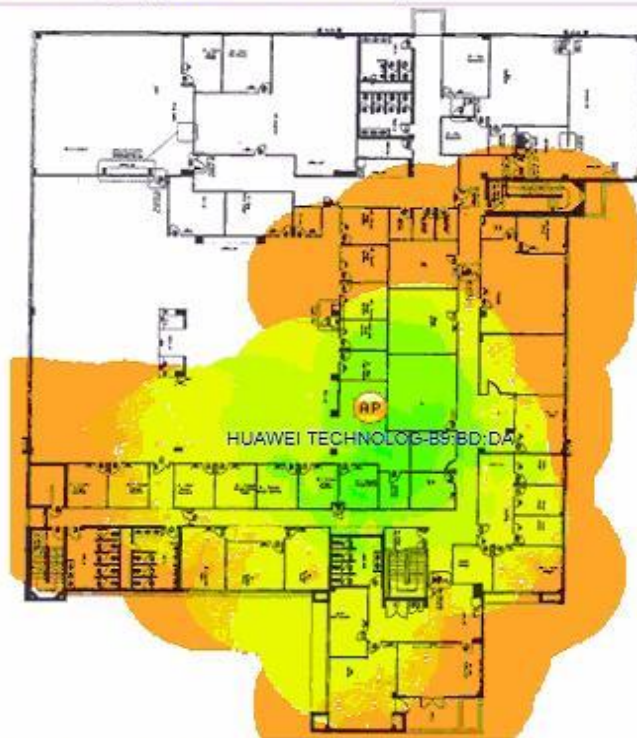
Ubiquiti Network-2A:2A:BC [CH (9),Office,-39]



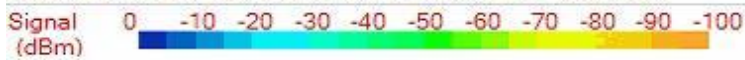
Individual Signal Distribution



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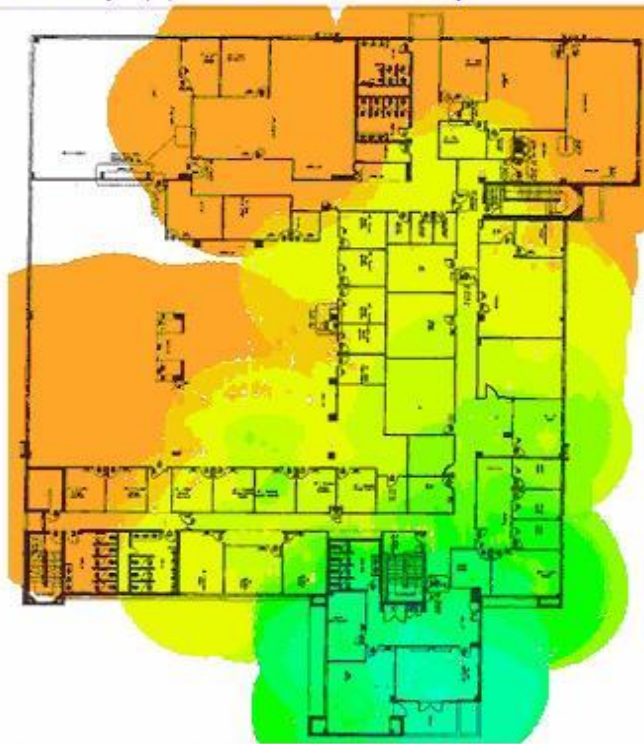
HUAWEI TECHNOLOG-B9:BD:DA [CH (10), VodafoneMobileWiFi-BDDA31, -55]



Individual Signal Distribution



HUAWEI TECHNOLOG-53:3E:5C [CH (11), VodafoneMobileWiFi-3E5C55, -38]



osboso4002 [CH (13), Cashbuild_SmartDevices, -35]



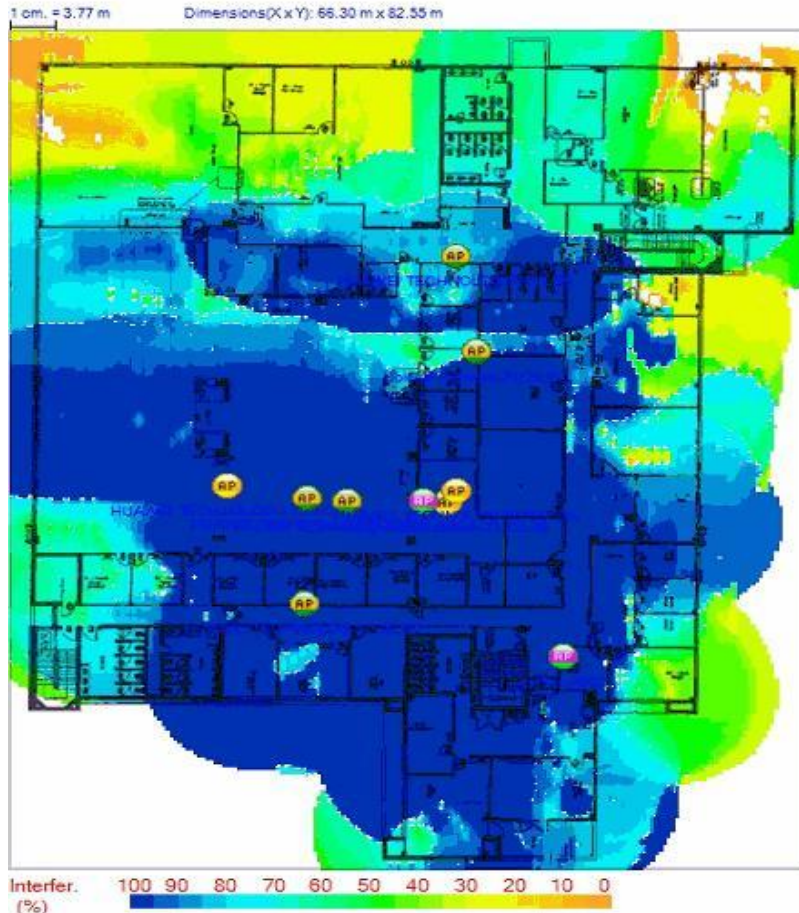
6.3 Channel Interference

The image below displays the interference level (in percentage) at each point on the map layout.

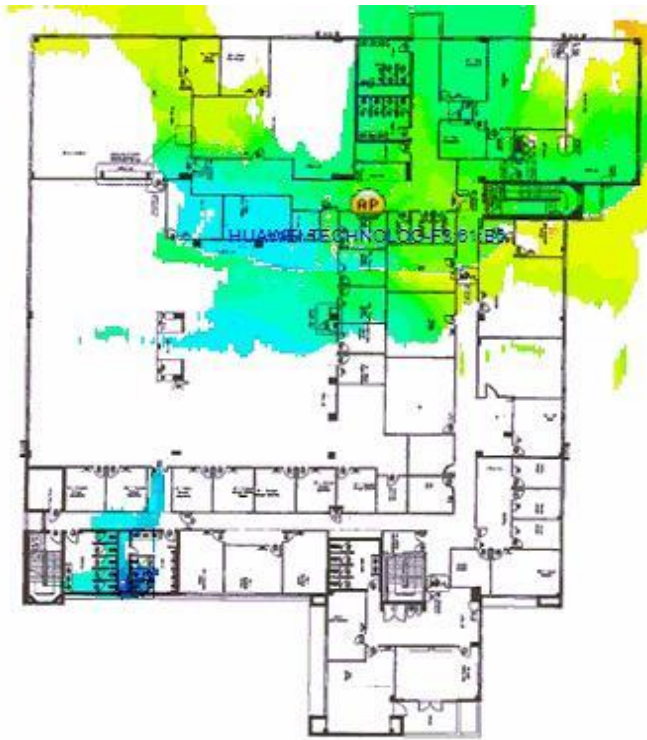
APs are displayed in their detected locations and reflect the existing power and antenna properties.

Note that the interference levels present in the environment can vary depending on several factors, such as the number of APs on a single channel, number of devices present, non-802.11 interferers, etc.

Note: Only the AP's that were placed on the floor plan prior to running the report will be shown on the floor plan image.



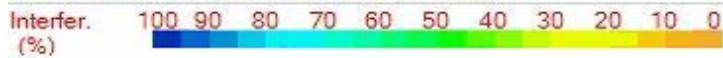
Individual Channel Interference Distribution



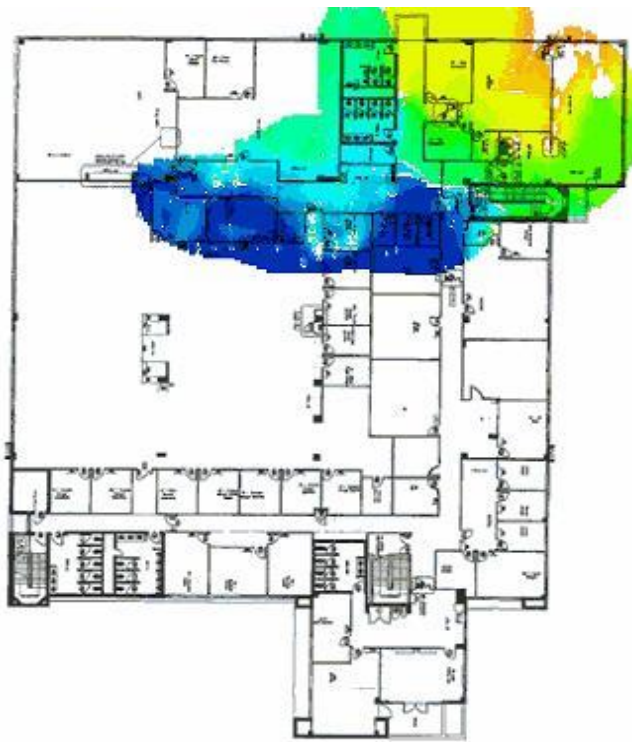
HUAWEI TECHNOLOG-F3:61:B6 [CH (1), HUAWEI-E5220-61b6, -58]



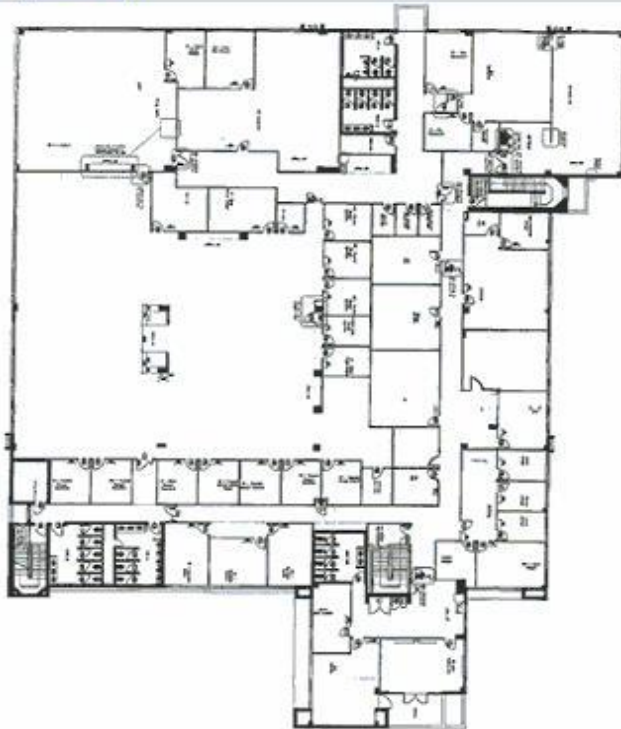
TP-LINK TECHNOLO-DC:57:AC [CH (1), Ogilvy Printer, -39]



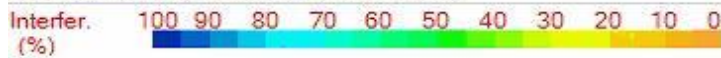
Individual Channel Interference Distribution



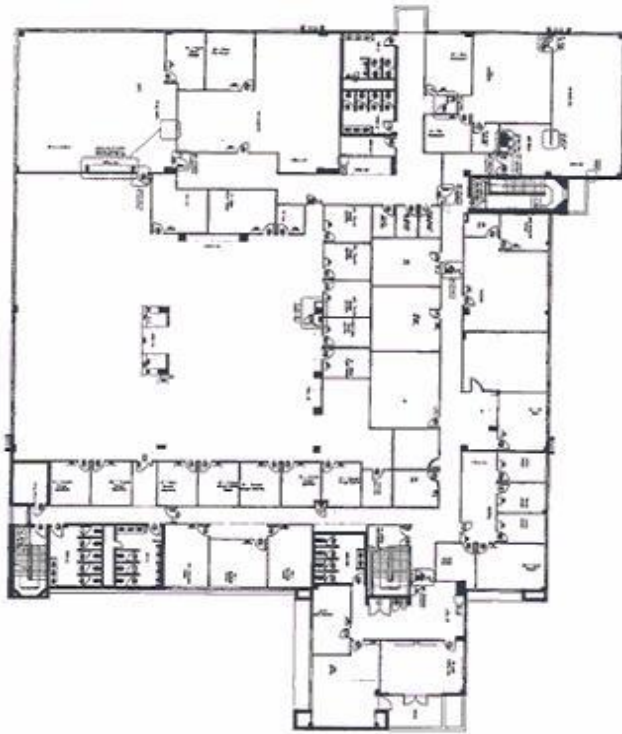
A2:A8:CD:B7:A8:86 [CH (4), Virtual, -61]



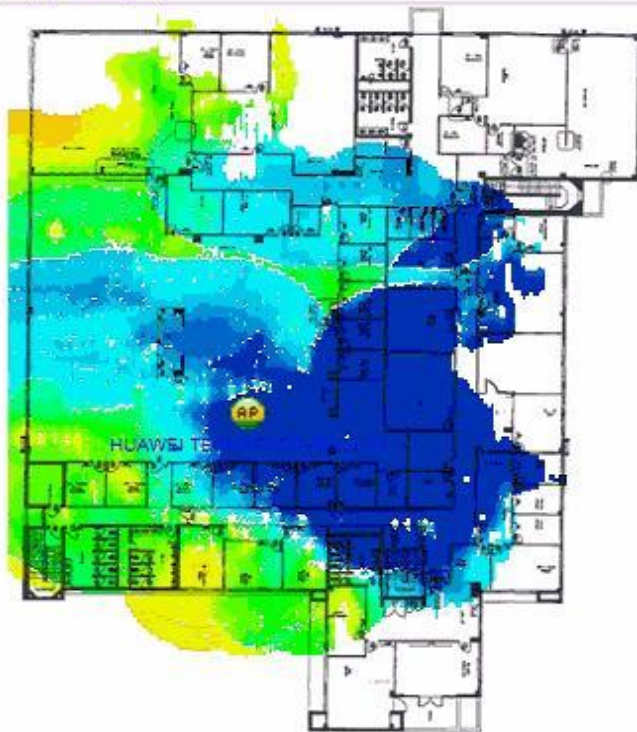
Cisco-B4:A0:61 [CH (4), Cashbuild_SmartDevices, -49]



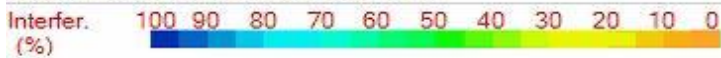
Individual Channel Interference Distribution



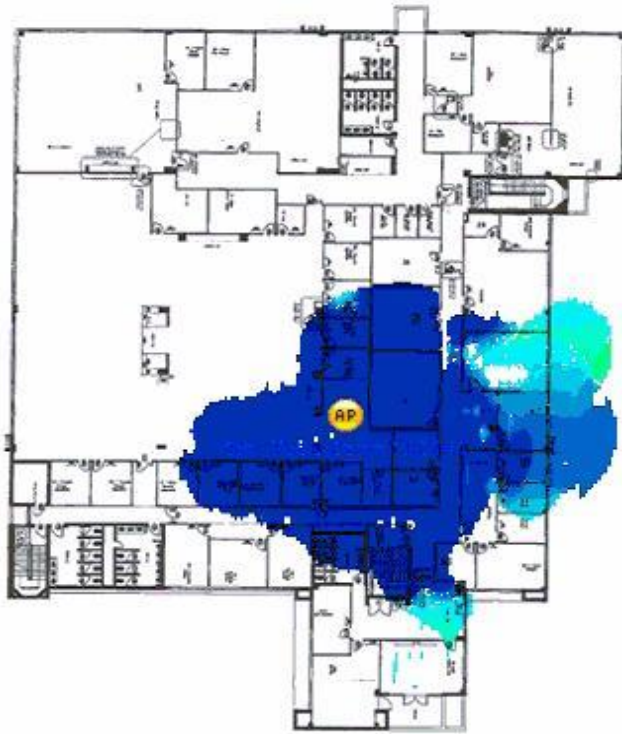
C2:9F:DB:63:2A:B4 [CH (6),Freeway,-76]



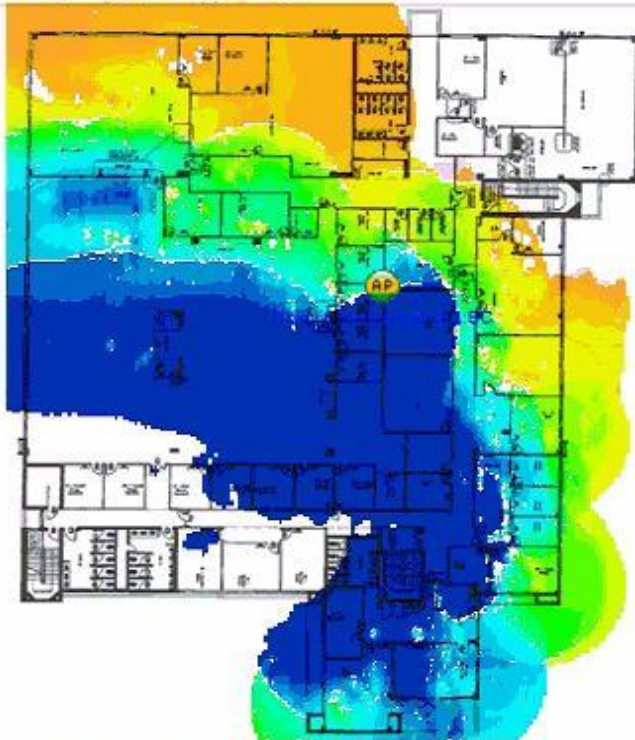
HUAWEI TECHNOLOG-BE:67:14 [CH (6),Chris,-45]



Individual Channel Interference Distribution



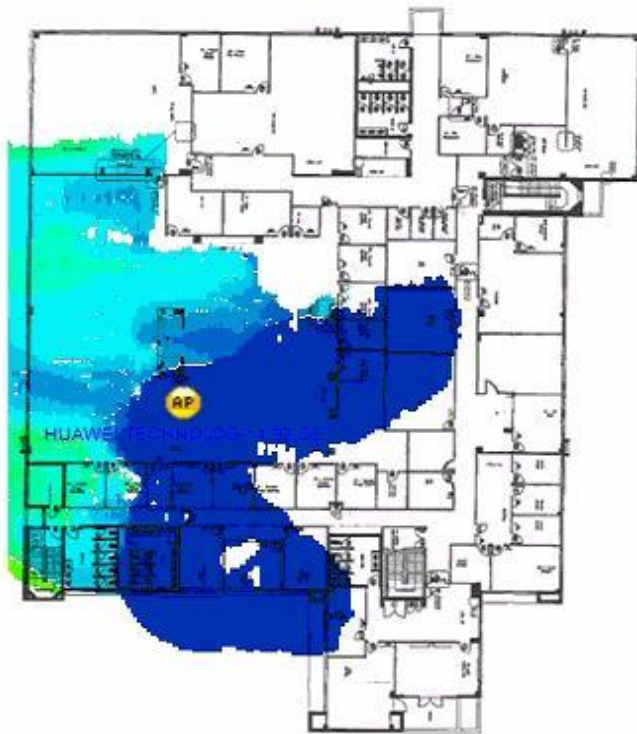
Sony Mobile Comm-73:C0:48 [CH (6),Xperia Z3_dad2,-51]



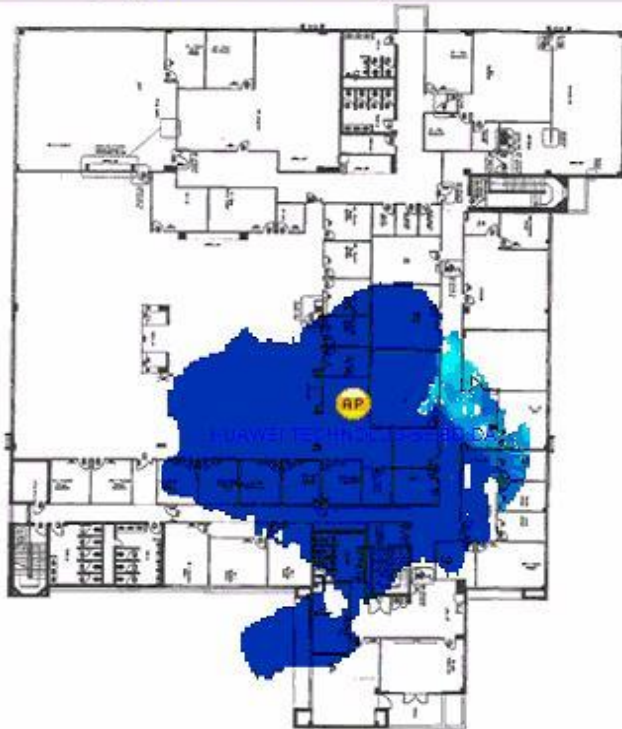
Ubiquiti Network-2A:2A:BC [CH (9),Office,-39]



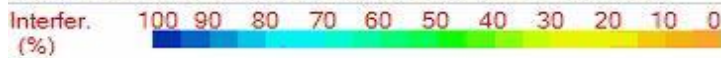
Individual Channel Interference Distribution



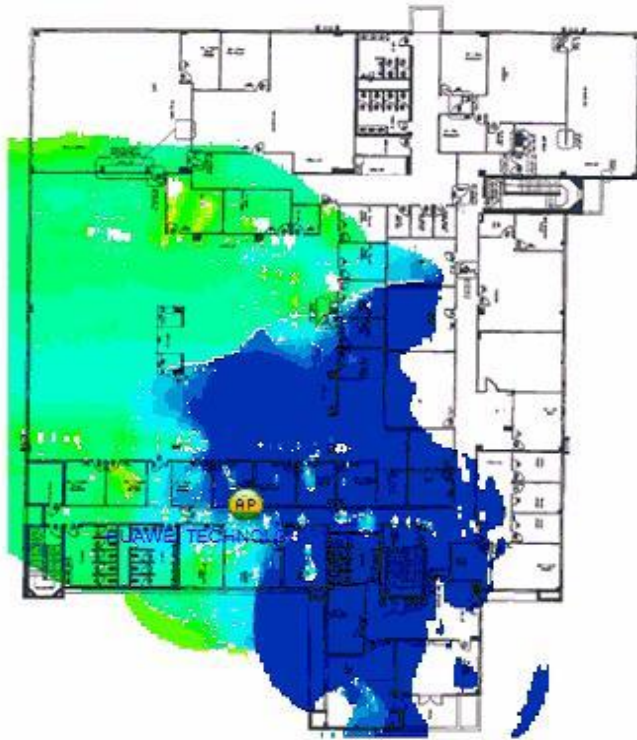
HUAWEI TECHNOLOG-11:90:C9 [CH (10), HUAWEI-E5330-90C9, -58]



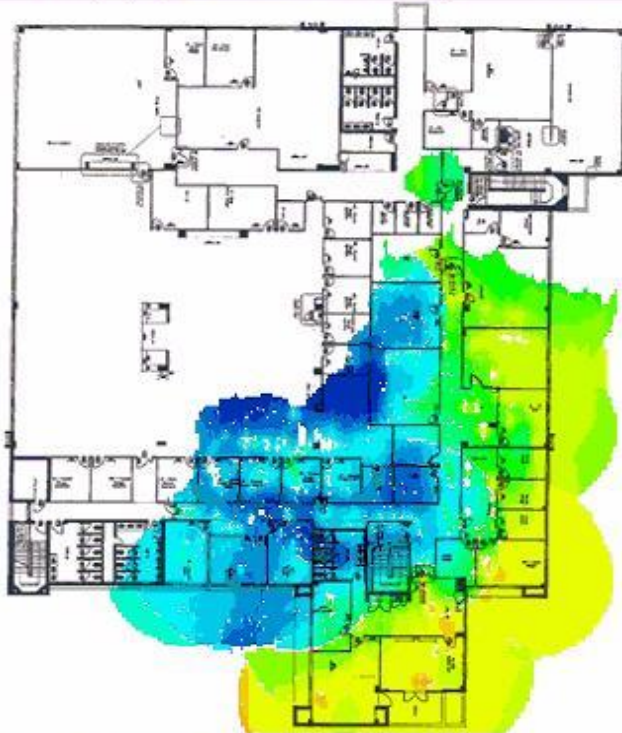
HUAWEI TECHNOLOG-B9:BD:DA [CH (10), VodafoneMobileWiFi-BDDA31, -55]



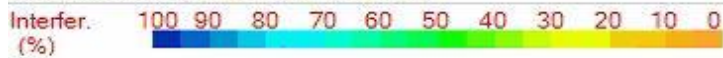
Individual Channel Interference Distribution



HUAWEI TECHNOLOG-53:3E:5C [CH (11), VodafoneMobileWiFi-3E5C55, -38]



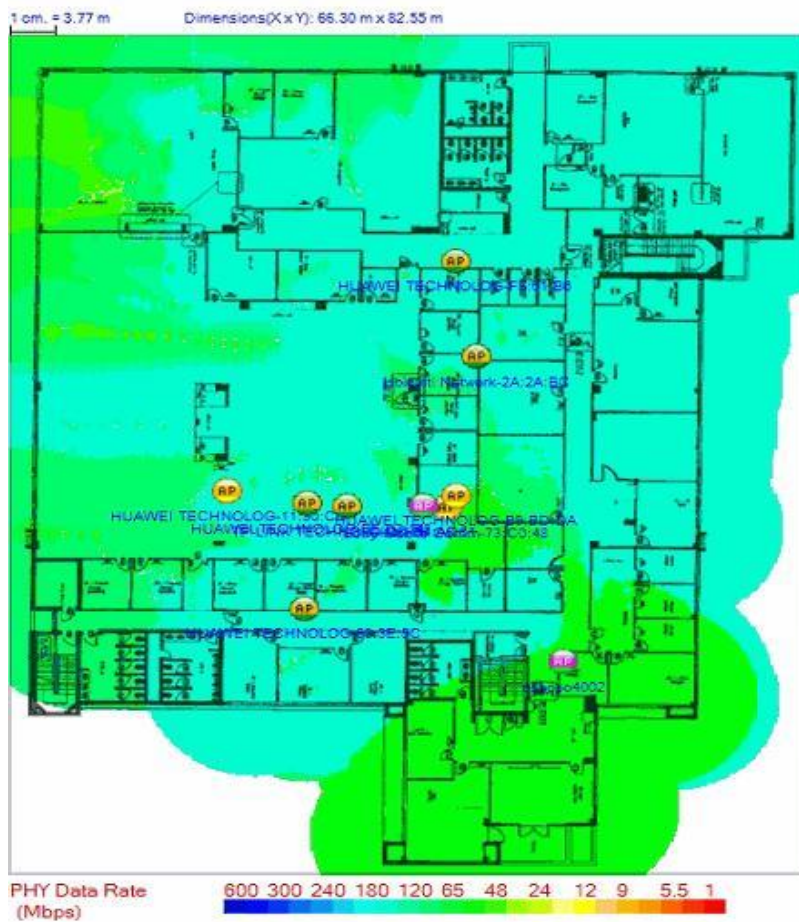
osboso4002 [CH (13), Cashbuild_SmartDevices, -35]



6.4 Predictive PHY Data Rate (Downlink)

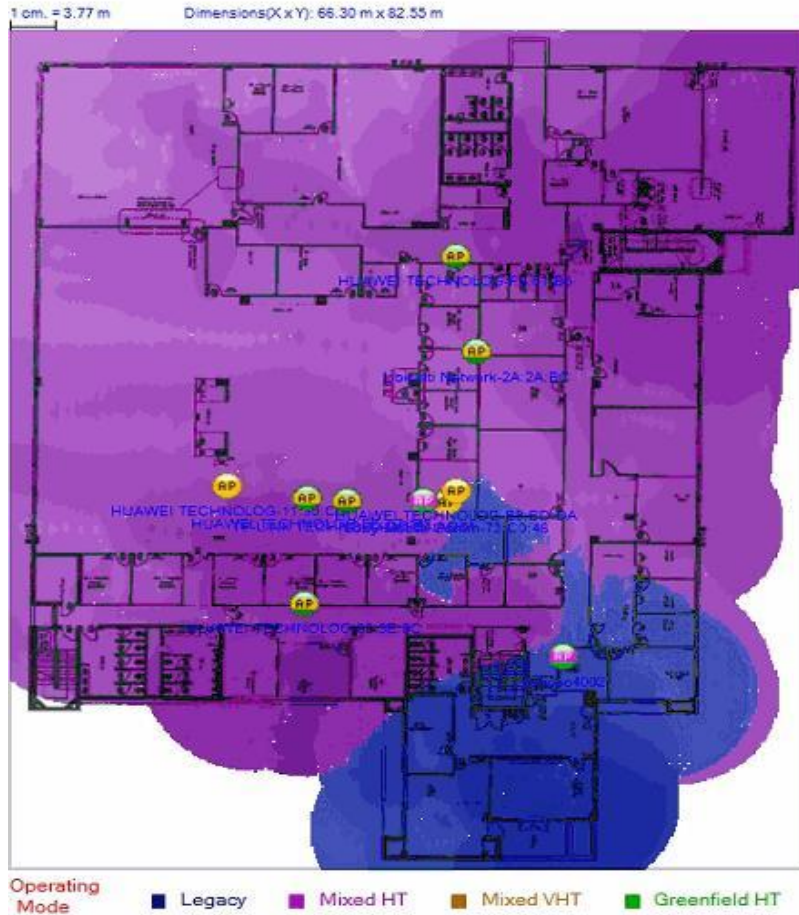
The image below displays the predictive PHY data rate connection downlink at each point in the map layout. Connection Rates provides a direct insight into how well the network will support a real-world end-user client. When doing a Passive survey the ability to see the actual Data rate is not available. In order to provide Data Rates while doing a Passive survey we use Signal Strength to Data Rate mapping table.

We take the detected signal strength and map it to a known Data Rate. A low Data Rate connection directly translates to lower throughput and performance for an end-user. Consistently low connection Rates are indicative of insufficient signal coverage, interference, noise, or miss-configured wireless devices.



6.5 Operating Mode

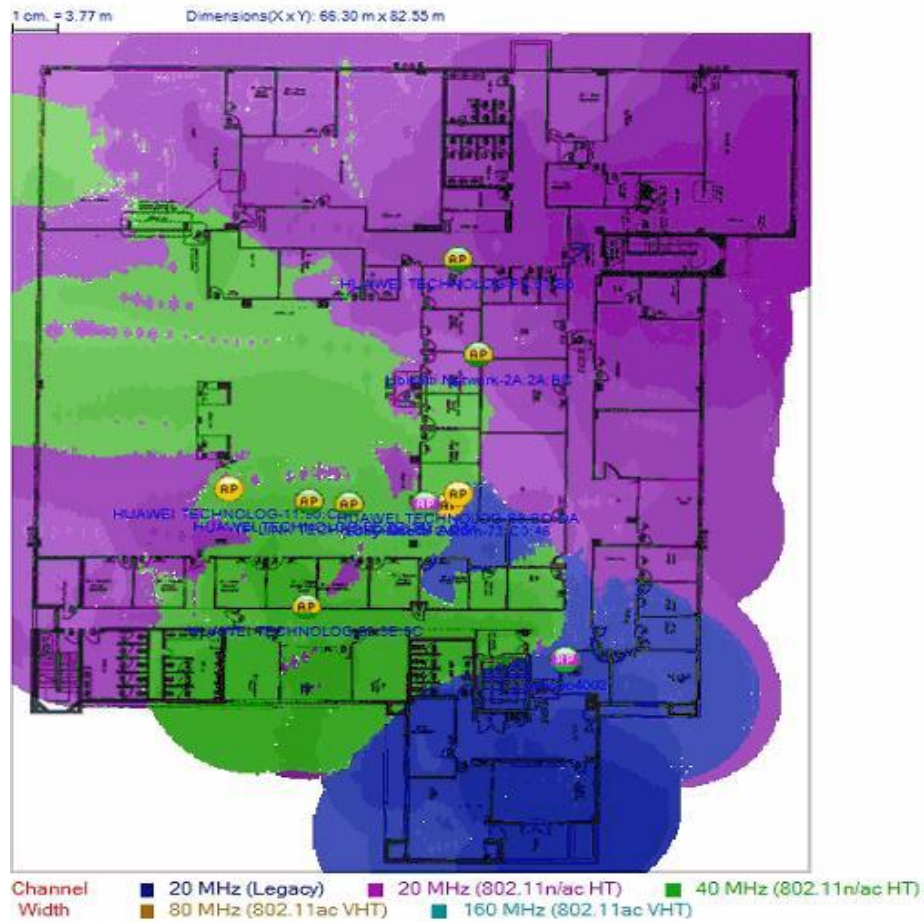
The image below displays the coverage of the 802.11 operating modes. Refer to the legend for the color that corresponds to each mode (Legacy, Mixed HT, Greenfield HT, or Mixed VHT). The heat map displays the color of the operating mode that corresponds to the AP with the strongest signal detected at any given point. For example, locations shown as Mixed HT may contain Mixed VHT signal coverage and vice versa, but the AP with the strongest signal in that area utilizes a Mixed HT implementation.



6.6 Channel Width

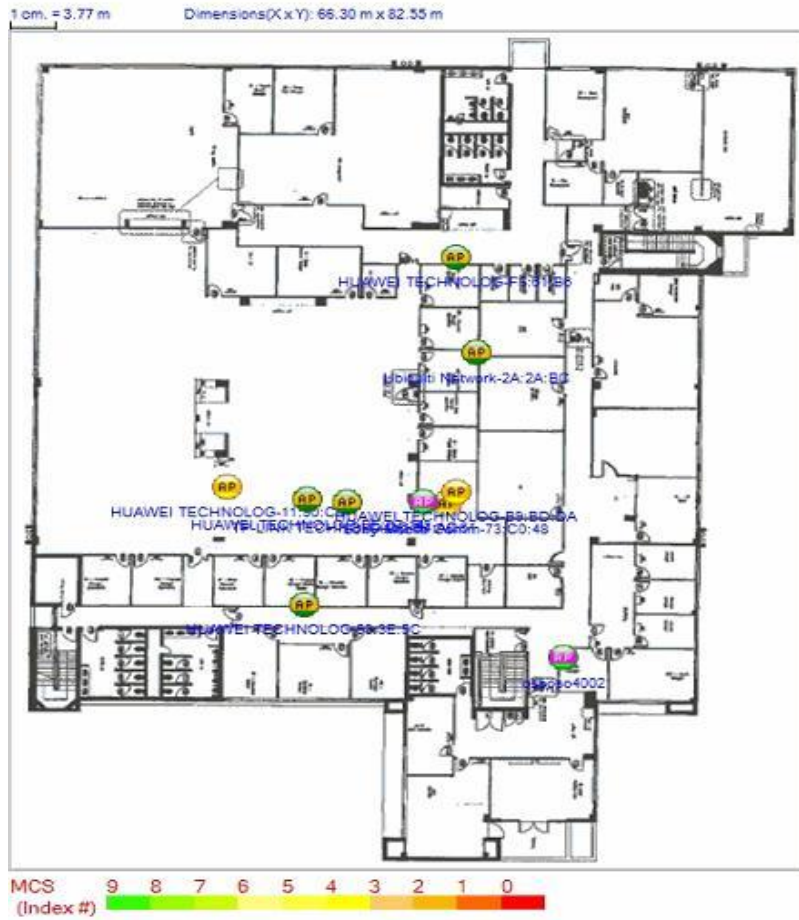
The image below displays the breakdown of the detected channel width.

The color shown represents the Channel Width of the AP with the strongest signal in any given area.



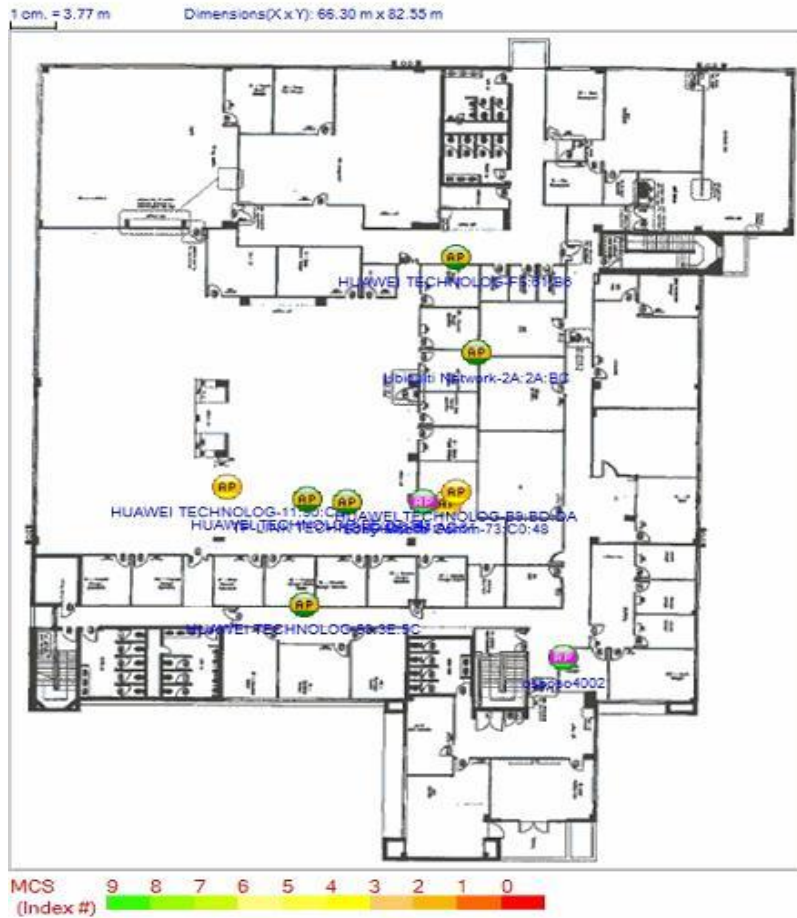
6.9 802.11ac Max MCS (AP Tx)

The image below displays the AP's detected 802.11ac MCS Transmission Rates. This heatmap reflects the 802.11ac AP MCS Transmit mode that was detected.



6.10 802.11ac Max MCS (AP Rx)

The image below displays the AP's detected 802.11ac MCS Receive Rates.



7 AirWISE Validation Against Requirements

This report section provides a comprehensive summary of all AirWISE data relating to the current survey project. Mboneni Wi-Fi's AirWISE engine allows users to specify minimum acceptable thresholds for various requirements within the network. It compares the data gathered during the survey process against the requirements. Requirements that are not met are highlighted in their respective sections. Several sections also contain signal heat maps that help demonstrate exactly where the threshold violations can be found. Each section provides a breakdown of each requirement and displays a pass/fail rating based on how well the collected results stand up against the objectives.

8 Per SSID Report

8.1 Access Points Information

Signal	AP Name	Media Type	MAC Address	Channel	SSID	Power,mW	Max
--------	---------	------------	-------------	---------	------	----------	-----

Number of AP:

Total APs:

8.2 Signal Distribution

Results for this section were not part of the survey

8.3 Noise Distribution

Results for this section were not part of the survey

8.4 Signal/Noise Distribution

Results for this section were not part of the survey

9 Conclusions

Overall, based on planned placement of the access points, more than % of the facility will meet the levels of RF signal strength (- dBm) and dB SNR as specified in the Statement of Work. Adjusting the scale to - dBm showed % of the entire survey area was covered at this signal strength.

In testing these areas it was noted that microwaves ovens and Bluetooth devices were in use.

The RF noise floor in this facility is remarkably low, showing less than - dBm.

Description	Value	Pass/Fail Result
<i>Desired Signal Coverage</i>	89.40% of Good Area.	Fail: 100.00% of Good Area. required to pass
Minimum AP signal strength required	-67 dBm	
<i>Multiple AP Signal Coverage</i>	61.60% of Good Area.	Fail: 100.00% of Good

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		Area. required to pass
Number of APs required to provide coverage	2	
Minimum AP signal strength required to provide coverage	-67 dBm	
Channel Interference	1.30% of Good Area.	Fail: 100.00% of Good Area. required to pass
Interfered APs: Exclude APs if signal strength is weaker than	-75 dBm	
Interfering APs: Exclude APs if signal strength is weaker than	-85 dBm	
Measured PHY Data Rate Uplink Coverage	N/A	N/A
Minimum AP PHY Data Rate required	5.50 Mbps	
Measured PHY Data Rate Downlink Coverage	N/A	N/A
Minimum AP PHY Data Rate required	54.00 Mbps	
Predictive PHY Data Rate Downlink Coverage	98.10% of Good Area.	Fail: 100.00% of Good Area. required to pass
Minimum AP PHY Data Rate required	54.00 Mbps	
Signal Noise Ratio Coverage	96.10% of Good Area.	Fail: 100.00% of Good Area. required to pass
Minimum Signal Noise Ratio required	25 dBm	
Noise Level	100.00% of Good Area.	Pass: 100.00% of Good Area. required to pass
Maximum Noise Level Allowed	-90 dBm	
User Capacity	N/A	N/A
Maximum Users Supported per AP	15	
With Load Balancing	True	
Operating Mode	0.00% of Good Area.	Fail: 100.00% of Good Area. required to pass
Greenfield Operating Mode	Allowed	
HT Mixed Operating Mode	Not Allowed	

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VHT Mixed Operating Mode	Allowed	
Legacy Operating Mode	Not Allowed	
Channel Width	32.80% of Good Area.	Fail: 100.00% of Good Area. required to pass
40 MHz Channel Width	Allowed	
20HT MHz Channel Width	Not Allowed	
20 MHz Legacy Channel Width	Not Allowed	
80 MHz Channel Width	Allowed	
160 MHz Channel Width	Allowed	
802.11n Highest MCS Index	55.50% of Good Area.	Fail: 100.00% of Good Area. required to pass
Minimum Tx MCS index required	15	
802.11ac Highest MCS Index	N/A	N/A
Minimum Tx MCS index required	9	