FIT 1047 ASSESSMENT 3

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Background

This report Outlines the results of a WLAN field survey conducted at the Hargrave Andrew Library, Clayton Campus, Monash. The purpose of the experiment was to evaluate the performance of the wireless network and identify potential problems related to channel occupancy, signal attenuation, and overall coverage.

Experiment

The survey used a WIFI-enabled laptop (mac) to scan wireless networks at different locations in the library and a mobile phone that could send hotspots. A total of four access points (APs) were identified. The measurements were carried out in eight different locations, ensuring coverage of at least 60 square meters. Record the following parameters for each AP (Figure 2 – Figure 9):

Network Name (SSID)

MAC Address (BSSID)

Signal Strength (dBm)

Signal to noise ratio (SNR)

Supports 802.11

Frequency band (2.4 or 5ghz)

Channel(s) used

A map of the survey area was drawn, indicating the location of ap and measuring points. (figure 1)

Result

Channel occupancy

The measurements show that two APs are running on overlapping channels, AP2 and AP3 on channel 36. This configuration may cause interference and affect the overall network performance. Aps can be reconfigured to run separately using non-overlapping channels.

Attenuation from different materials

The signal strength measurement shows that the attenuation of the building material to the signal is obvious. For example, when measuring the strength of AP3, measuring position No. 3 and measuring position No. 8 have a glass wall in the middle. The glass wall blocking area (position 8) decreased by about 10 dBm compared to the open area (position 3) (see Figure 4 and Figure 9). In contrast, measuring position 6 and measuring position 7 measure the strength of AP4 with a concrete wall in the middle. The concrete wall blocking area (position 6) decreased by about 15 dBm compared to the open area (position 7) (see Figure 7 and Figure 8). This shows that the effect of not using materials on WIFI signal strength is also different.

Coverage

Coverage analysis shows that basically all parts of the country are fully serviced by WIFI, but overall speed can be improved because dBm is low even in open Spaces. Can also improve the configuration, such as using non-overlapping channels to improve dBm.

Measure the attenuation caused by body

Using a mobile hotspot as an AP, the signal strength is -31dBm when the mobile hotspot is placed in an open area next to the measuring computer (without any occlusion). However, when the mobile hot spot is placed behind the body and the body is wrapped around the mobile hot spot, the signal strength is -50dBm. As a result, the human body significantly reduces WIFI signal strength. Because the human body is mainly composed of water and organic matter, water has a significant absorption effect

on electromagnetic waves. (Figure 10 and Figure 11)

Appendix

MAP

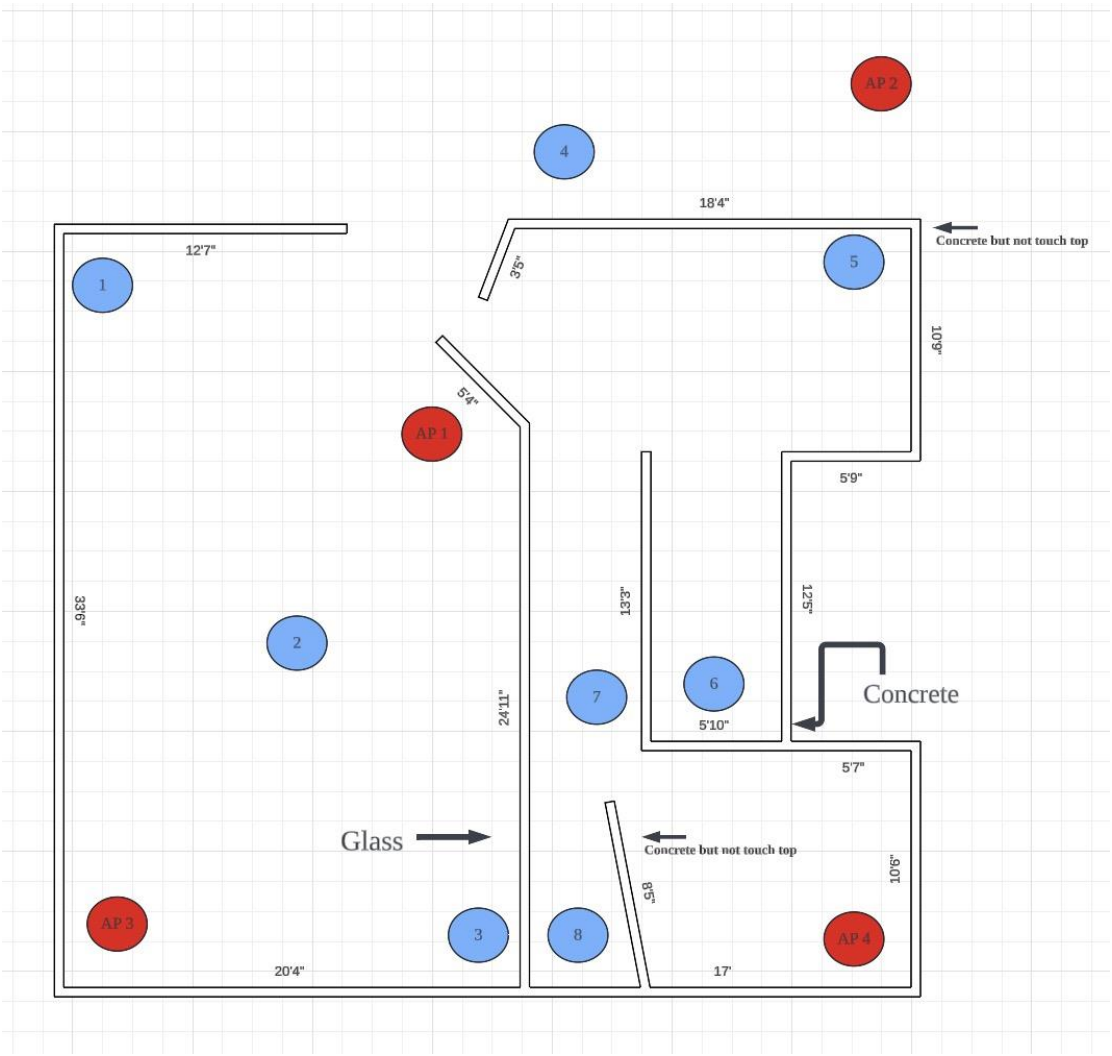

Figure 1

Screenshots of Measurement Data

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
eduroam	A4:88:73:9A:FD:8F		100	5	WPA2-Enterprise	Cisco System...	ac/ax		-64	-66	-64	-67	-93	now
eduroam	A4:88:73:DD:AC:6F		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-74	-75	-74	-75	-92	now
eduroam	A4:88:73:DD:A1:EF		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-84	-82	-81	-84	-92	now
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-85	-82	-79	-85	-93	now

Figure 2

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
eduroam	A4:88:73:DD:AC:6F		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-64	-71	-59	-76	-93	now
eduroam	A4:88:73:9A:FD:8F		100	5	WPA2-Enterprise	Cisco System...	ac/ax		-68	-67	-64	-69	-92	now
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-75	-81	-75	-85	-92	now
eduroam	A4:88:73:DD:A1:EF		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-88	-84	-79	-89	-93	now

Figure 3

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-64	-71	-13	-88	-91	now
eduroam	A4:88:73:DD:AC:6F		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-67	-74	-48	-90	-92	now
eduroam	A4:88:73:9A:FD:8F		100	5	WPA2-Enterprise	Cisco System...	ac/ax		-74	-68	-46	-77	-91	now
eduroam	A4:88:73:DD:A1:EF		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-82	-81	-65	-90	-92	now

Figure 4

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
eduroam	A4:88:73:DD:A1:EF		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-74	-83	-69	-90	-93	6s ago
eduroam	A4:88:73:9A:FD:8F		100	5	WPA2-Enterprise	Cisco System...	ac/ax		-77	-67	-56	-77	-91	6s ago
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-85	-82	-71	-88	-89	6s ago
eduroam	A4:88:73:DD:AC:6F		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-96	-68	-48	-77	-96	31s ago

Figure 5

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
eduroam	A4:88:73:DD:A1:EF		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-65	-82	-65	-90	-93	now
eduroam	A4:88:73:9A:FD:8F		100	5	WPA2-Enterprise	Cisco System...	ac/ax		-76	-69	-56	-77	-92	now
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-85	-82	-71	-88	-90	now
eduroam	A4:88:73:DD:AC:6F		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-89	-71	-48	-89	-91	now

Figure 6

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
eduroam	A4:88:73:9A:FD:8F		100	5	WPA2-Enterprise	Cisco System...	ac/ax		-68	-69	-56	-77	-91	now
eduroam	A4:88:73:DD:AC:6F		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-78	-74	-48	-90	-91	now
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-79	-82	-71	-88	-91	now
eduroam	A4:88:73:DD:A1:EF		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-80	-81	-65	-90	-91	now

Figure 7

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
eduroam	A4:88:73:9A:FD:8F		100	5	WPA2-Enterprise	Cisco System...	ac/ax		-61	-69	-56	-77	-91	4s ago
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-66	-81	-66	-88	-91	4s ago
eduroam	A4:88:73:DD:AC:6F		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-70	-74	-48	-90	-92	4s ago
eduroam	A4:88:73:DD:A1:EF		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-87	-81	-65	-90	-92	4s ago

Figure 8

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-69	-80	-63	-88	-92	4s ago
eduroam	A4:88:73:9A:FD:8F		100	5	WPA2-Enterprise	Cisco System...	ac/ax		-74	-69	-56	-77	-92	4s ago
eduroam	A4:88:73:DD:AC:6F		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-77	-74	-48	-90	-93	4s ago
eduroam	A4:88:73:DD:A1:EF		36	5	WPA2-Enterprise	Cisco System...	ac/ax		-89	-81	-65	-90	-93	4s ago

Figure 9

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-31	-65	-9	-88	-93	4s ago

Figure 10

SSID	BSSID	Graph	Channel	Band	Security	Vendor	Mode	Level (SNR)	Signal	Avg	Max	Min	Noise	Last seen
WLAN hotpoint	36:0B:46:43:8A:F5		64	5	WPA2-Personal	-	ac		-50	-65	-9	-88	-93	3s ago

Figure 11