



COMP9336 – Mobile Data Networking

Lab 2

T2 2022

Assignment 1

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Task 1 a: Wireshark apply filtering that only display of all beacon frames from SSID=COMP4336 (Include Signal Strength, Noise level and SNR columns)

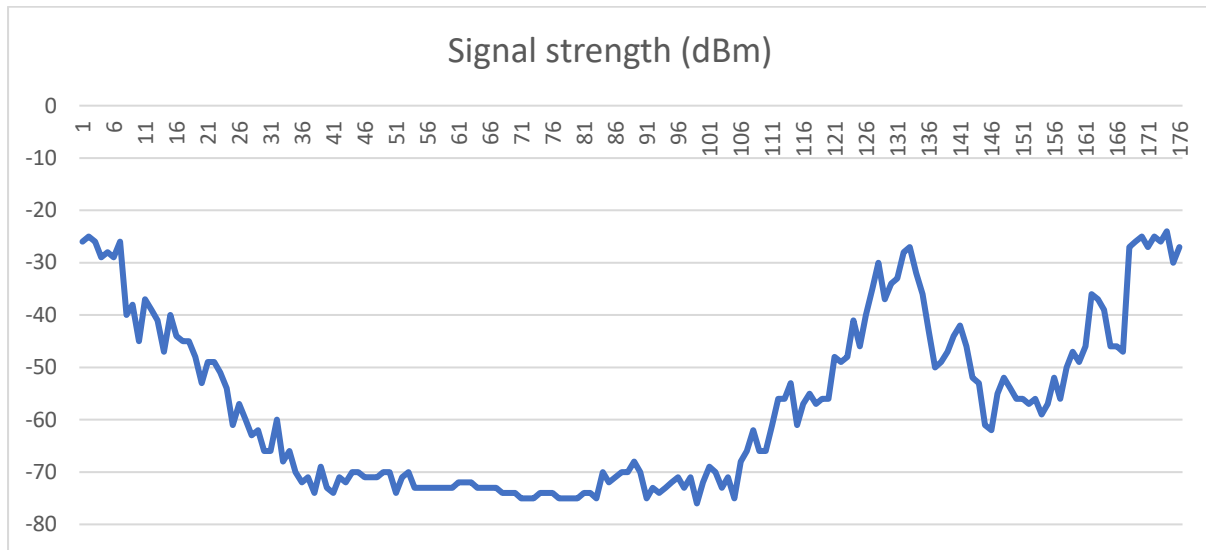
wlan.ssid==COMP4336								
No.	Time	Source	Length	Signal strength (dBm)	RSSI	Noise level (dBm)	Signal/noise ratio (dB)	SSID
12	0.064099	46:b3:2c:81:00:f3	244	-26 dBm		-85 dBm	59 dB	COMP4336
57	1.907470	46:b3:2c:81:00:f3	244	-25 dBm		-86 dBm	61 dB	COMP4336
65	2.214666	46:b3:2c:81:00:f3	244	-26 dBm		-86 dBm	60 dB	COMP4336
114	2.521757	46:b3:2c:81:00:f3	244	-29 dBm		-86 dBm	57 dB	COMP4336
225	4.365076	46:b3:2c:81:00:f3	244	-28 dBm		-87 dBm	59 dB	COMP4336
228	4.672234	46:b3:2c:81:00:f3	244	-29 dBm		-87 dBm	58 dB	COMP4336
239	4.979462	46:b3:2c:81:00:f3	244	-26 dBm		-87 dBm	61 dB	COMP4336
484	5.901089	46:b3:2c:81:00:f3	244	-40 dBm		-87 dBm	47 dB	COMP4336
516	6.208294	46:b3:2c:81:00:f3	244	-38 dBm		-88 dBm	50 dB	COMP4336
521	6.515754	46:b3:2c:81:00:f3	244	-45 dBm		-88 dBm	43 dB	COMP4336
524	6.822690	46:b3:2c:81:00:f3	244	-37 dBm		-88 dBm	51 dB	COMP4336
557	8.358725	46:b3:2c:81:00:f3	244	-39 dBm		-87 dBm	48 dB	COMP4336
570	8.665925	46:b3:2c:81:00:f3	244	-41 dBm		-87 dBm	46 dB	COMP4336
572	8.973108	46:b3:2c:81:00:f3	244	-47 dBm		-87 dBm	40 dB	COMP4336
595	10.816329	46:b3:2c:81:00:f3	244	-40 dBm		-88 dBm	48 dB	COMP4336
596	11.123428	46:b3:2c:81:00:f3	244	-44 dBm		-87 dBm	43 dB	COMP4336
648	11.430711	46:b3:2c:81:00:f3	244	-45 dBm		-87 dBm	42 dB	COMP4336
655	11.737942	46:b3:2c:81:00:f3	244	-45 dBm		-87 dBm	42 dB	COMP4336
755	13.273939	46:b3:2c:81:00:f3	244	-48 dBm		-86 dBm	38 dB	COMP4336
784	13.51052	46:b3:2c:81:00:f3	244	-53 dBm		-86 dBm	33 dB	COMP4336
792	13.888365	46:b3:2c:81:00:f3	244	-49 dBm		-86 dBm	37 dB	COMP4336
793	14.195460	46:b3:2c:81:00:f3	244	-49 dBm		-85 dBm	36 dB	COMP4336
797	15.731475	46:b3:2c:81:00:f3	244	-51 dBm		-85 dBm	34 dB	COMP4336
825	16.039969	46:b3:2c:81:00:f3	244	-54 dBm		-84 dBm	30 dB	COMP4336
829	16.345988	46:b3:2c:81:00:f3	244	-61 dBm		-84 dBm	23 dB	COMP4336
849	16.653088	46:b3:2c:81:00:f3	244	-57 dBm		-84 dBm	27 dB	COMP4336
896	18.496406	46:b3:2c:81:00:f3	244	-60 dBm		-84 dBm	24 dB	COMP4336
942	18.803619	46:b3:2c:81:00:f3	244	-63 dBm		-84 dBm	21 dB	COMP4336
947	19.110696	46:b3:2c:81:00:f3	244	-62 dBm		-85 dBm	23 dB	COMP4336
980	19.418002	46:b3:2c:81:00:f3	244	-66 dBm		-85 dBm	19 dB	COMP4336
1108	20.954038	46:b3:2c:81:00:f3	244	-66 dBm		-85 dBm	19 dB	COMP4336
1115	21.261256	46:b3:2c:81:00:f3	244	-60 dBm		-86 dBm	26 dB	COMP4336
1136	21.568313	46:b3:2c:81:00:f3	244	-68 dBm		-86 dBm	18 dB	COMP4336
1139	21.875656	46:b3:2c:81:00:f3	244	-66 dBm		-86 dBm	20 dB	COMP4336
1151	23.411572	46:b3:2c:81:00:f3	244	-70 dBm		-86 dBm	16 dB	COMP4336
1189	23.718870	46:b3:2c:81:00:f3	244	-72 dBm		-86 dBm	14 dB	COMP4336
1192	24.026118	46:b3:2c:81:00:f3	244	-71 dBm		-86 dBm	15 dB	COMP4336
1219	24.333274	46:b3:2c:81:00:f3	244	-74 dBm		-86 dBm	12 dB	COMP4336
1554	26.483597	46:b3:2c:81:00:f3	244	-69 dBm		-85 dBm	16 dB	COMP4336
1555	26.700806	46:b3:2c:81:00:f3	244	-73 dBm		-85 dBm	12 dB	COMP4336

The lab2.pcapng is downloaded from the following link:

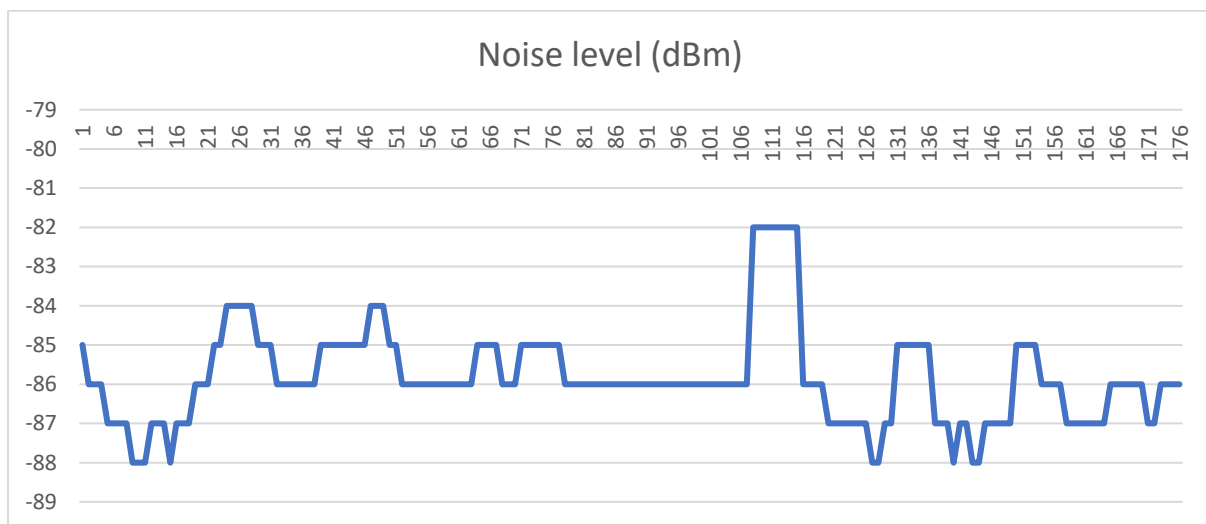
- <https://cloudstor.aarnet.edu.au/plus/s/wVjxpWUJaEsgUgi>

Opened the pcapng file by using Wireshark and applied a filter to only display the SSID = COMP4336 beacon frames. The above screenshot only shows part of the SSID beacon frames as there is a total of 177 which is not feasible to put all within this report.

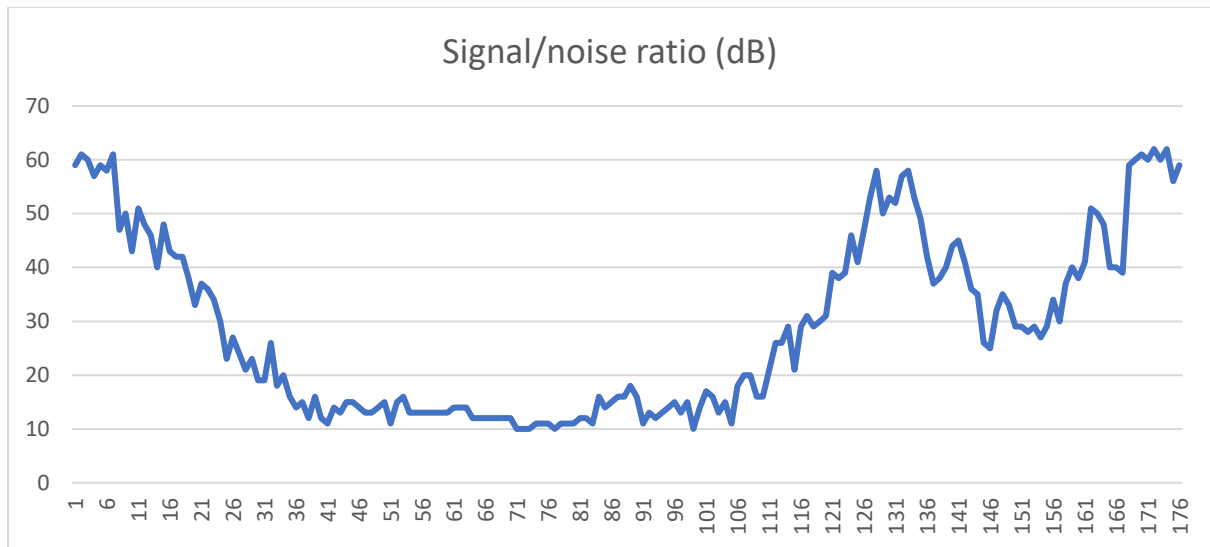
Task 1 b & c: Provide Signal Strength Graph, Noise level graph and SNR Graph and provide commentary to the graphs.



From the Signal Strength Diagram shown above, the Receiver's to the beacon AP distance increase and after package 101 then the receiver is getting closer to the AP. Basically, we can use the Signal Strength to detect or guess the distance between receiver and the AP distance. But the signal strength could be affected by obstacle and the obstacle's material such as Wall, glass and doors and so on. (To Generate the Diagram, we will need to convert the value from string to integers)



The Noise level is affected by the environment. There could be some other 2.4 GHz and 5GHz Signals that depends on the which frequency of the WIFI in use and etc. But we can see that the average Noise level is relatively low that won't affect the WIFI too much. (To Generate the Diagram, we will need to convert the value from string to integers)



The SNR is calculated based on the Signal Strength and the Noise level. Due to the Noise level being relatively stable, we will not see too much difference between the SNR diagram to the Signal Strength diagram. But they do have some minor differences. (To Generate the Diagram, we will need to convert the value from string to integers)

Task 2 a: Provide the Screenshot of the Wireshark to show the filtering expression

ip.dst==172.20.10.10							
No.	Time	Source	Destination	Length	Signal strength (dBm)	RSSI	Noise level (dBm) Signal/noise ratio (dB)
3	0.000000000	149.137.49.149	172.20.10.10	106	48 dBm	48	
4	0.074134000	149.137.49.149	172.20.10.10	182	48 dBm	48	
11	0.167123000	149.137.49.149	172.20.10.10	182	43 dBm	43	
14	0.242621200	149.137.49.149	172.20.10.10	158	47 dBm	47	
16	0.270576500	149.137.49.149	172.20.10.10	182	48 dBm	48	
43	0.370938500	149.137.49.149	172.20.10.10	182	43 dBm	43	
47	0.471965800	149.137.49.149	172.20.10.10	182	42 dBm	42	
51	0.563917300	149.137.49.149	172.20.10.10	182	45 dBm	45	
52	0.674820100	149.137.49.149	172.20.10.10	182	44 dBm	44	
54	0.694175600	10.4.79.210	172.20.10.10	162	44 dBm	44	
55	0.767534700	149.137.49.149	172.20.10.10	182	42 dBm	42	
57	0.810209500	1.1.1.1	172.20.10.10	126	41 dBm	41	
58	0.868914900	149.137.49.149	172.20.10.10	182	43 dBm	43	
60	0.975036900	149.137.49.149	172.20.10.10	182	44 dBm	44	
61	1.079390400	149.137.49.149	172.20.10.10	182	44 dBm	44	
63	1.175034100	149.137.49.149	172.20.10.10	182	44 dBm	44	
65	1.177212900	149.137.49.149	172.20.10.10	106	45 dBm	45	
66	1.182897200	149.137.49.149	172.20.10.10	156	45 dBm	45	
68	1.213598700	10.4.79.210	172.20.10.10	162	45 dBm	45	
70	1.261672700	149.137.49.149	172.20.10.10	158	46 dBm	46	
71	1.272608400	149.137.49.149	172.20.10.10	182	45 dBm	45	
72	1.365981700	149.137.49.149	172.20.10.10	182	46 dBm	46	
74	1.470199500	149.137.49.149	172.20.10.10	175	43 dBm	43	
75	1.470199500	149.137.49.149	172.20.10.10	182	43 dBm	43	
77	1.486195000	149.137.49.149	172.20.10.10	175	42 dBm	42	
78	1.578555700	149.137.49.149	172.20.10.10	182	46 dBm	46	
80	1.679615800	149.137.49.149	172.20.10.10	182	45 dBm	45	
82	1.729074300	149.137.49.149	172.20.10.10	175	45 dBm	45	
83	1.731685600	149.137.49.149	172.20.10.10	175	44 dBm	44	
85	1.775020200	149.137.49.149	172.20.10.10	182	42 dBm	42	
87	1.819765600	1.1.1.1	172.20.10.10	126	44 dBm	44	
90	1.853619400	149.137.49.149	172.20.10.10	175	49 dBm	49	
92	1.862541700	149.137.49.149	172.20.10.10	175	49 dBm	49	
93	1.863500700	149.137.49.149	172.20.10.10	182	49 dBm	49	
94	1.972649900	149.137.49.149	172.20.10.10	182	44 dBm	44	
96	2.069355200	149.137.49.149	172.20.10.10	182	45 dBm	45	
99	2.149602700	149.137.49.149	172.20.10.10	151	45 dBm	45	
101	2.159416100	149.137.49.149	172.20.10.10	151	45 dBm	45	
102	2.169810100	149.137.49.149	172.20.10.10	182	43 dBm	43	
104	2.209378400	149.137.49.149	172.20.10.10	106	37 dBm	37	

Wireless LAN adapter WiFi:

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Connection-specific DNS Suffix . : 
IPv6 Address. . . . . : 2001:8004:44f0:87f2:4172:750e:68b5:ecd8
Temporary IPv6 Address. . . . . : 2001:8004:44f0:87f2:bdf6:824b:96dd:e77c
Link-local IPv6 Address . . . . . : fe80::4172:750e:68b5:ecd8%9
IPv4 Address. . . . . : 172.20.10.10
Subnet Mask . . . . . : 255.255.255.240
Default Gateway . . . . . : fe80::fcaa:81ff:fe4b:fb64%9
                           172.20.10.1

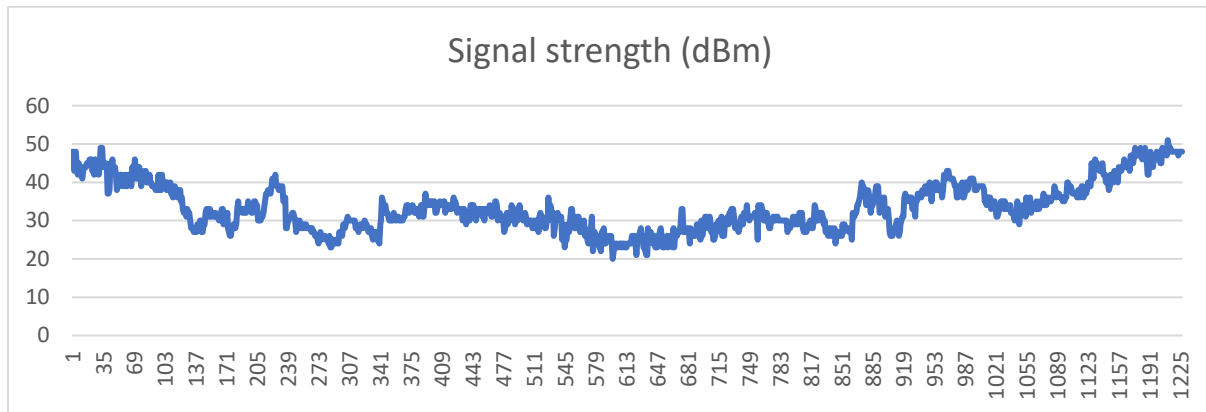
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As discussed, the Microsoft Network Monitor cannot read the SSID of my phone's hotspot, so I use the filtering to display the end device that connect to my phone's hotspot.

The default gateway: 172.20.10.1 is my phone

The IPv4 address: 172.20.10.10 is the end device (My PC).

Task 2 b: Provide Signal Strength Graph, Noise level graph and SNR Graph and provide commentary to the graphs.



Due to the limitation of my WIFI receiver, the signal Strength that is read by using **Microsoft Network Monitor** is a positive value. But we can still see that as I move further from the end Device (Holding my Phone), the signal strength drops, and the time I walk closer than the signal strength increases.

You may see that the signal is not constantly increasing or decreasing due to obstacles existing that block the signal, signal reflection, Diffraction, and Scattering involved, you may not see the result as very obvious. But overall, the signal strength Decreases and then increases as I walk further and back

Due to the limitation of the WIFI receiver (Technical Issue), the Noise level, and SNR cannot be obtained by the Software. But we can assume that the result would be similar to Task 1. But I can imagine that the Noise level will be higher than the provided packet capture due to there are numbers of WIFI SSID around my area that will affect the SNR result, but the overall pattern is the same.