

Network Administration/System Administration (NTU CSIE, Spring 2024)

Lab 10 - Wireless

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1 尋找目標 AP

1.1 SSID and BSSID

The BSSID can be directly obtained in Wi-Fi details.

SSID	BSSID
nasa-lab10-2.4G	30:87:d9:31:97:69
nasa-lab10-5G	30:87:d9:f1:97:6c



(a) 2.4 GHz



(b) 5 GHz

1.2 AP location

We measure the RSSI of nasa-lab10-5G when standing right beside every AP.

AP location	RSSI
R204	-29 dBm
R208	-63 dBm
R214	-81 dBm



(a) R204



(b) R208



(c) R214

The signal is the strongest while standing next to the AP in R204, so we infer that the AP is the one in R204.

2 測量數據

Terms

- **RSSI:** Received signal strength indicator. The amount of power of a received signal. It's measured in dBm (decibel-milliwatts), decibels relative to one milliwatt.
- **SNR:** Signal-to-noise ratio. A lower value means clearer signal and less noise. It's measured in dB (decibels).
- **Transmission rate:** Maximum theoretical transmission rate calculated from the current negotiated transfer scheme. Signal strength and SNR could affect which scheme is chosen. It's usually measured in Mbps (Megabits per second).

Result

Frequency	Condition	RSSI	SNR	Transmission rate
2.4 GHz	Next to AP	-32 dBm	54 dB	144 Mbps
	Farthest line of sight	-47 dBm	43 dB	144 Mbps
	Behind wall	-44 dBm	46 dB	144 Mbps
5 GHz	Next to AP	-29 dBm	63 dB	866 Mbps
	Farthest line of sight	-54 dBm	36 dB	130 Mbps
	Behind wall	-55 dBm	39 dB	585 Mbps



(a) 2.4 GHz, next to AP



(b) 2.4 GHz, farthest line of sight



(c) 2.4 GHz, behind wall



(d) 5 GHz, next to AP



(e) 5 GHz, farthest line of sight



(f) 5 GHz, behind wall

3 分析數據

Distance mainly affects the RSSI, which in turn determines the transmission rate. The farther away the receiver is to the AP, the less power it would receive, and the transmission rate would drop as well. Noise is not influenced by distance according to our experiment.

5 GHz signals can only achieve the maximum transmission rates if the signal is fairly strong; even if the signal strength drops by a little, the maximum transmission rate will drop. On the other hand, 2.4 GHz signals can still operate at its maximum rate if the signal drops by around 10 dB. However note that 2.4 GHz transmission rates are slower than that of 5 GHz.

When a wall is between the transmitter and the receiver, 5 GHz signals degrades more than 2.4 GHz signals. This is because waves with longer wavelengths can penetrate through obstacles better.