Departamento de Eletrónica, Telecomunicações e Informática

Universidade de Aveiro

WLAN - Project 2

Comunicações Móveis

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Group 2

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Introduction

Goal:
Test and verify the functional and performance aspects of IEEE 802.11 technology

IEEE 802.11:
IEEE 802.11 is part of the IEEE 802 set of technical standards and specifies the set of MAC and PHY protocols for implementing WLAN communication

Case studies:

- Impact of **coverage** and **performance** configurations
- Occurrence of **roaming** between APs
- Behaviour of **ad-hoc** network
- Importance of **RTS** and **CTS** mechanism

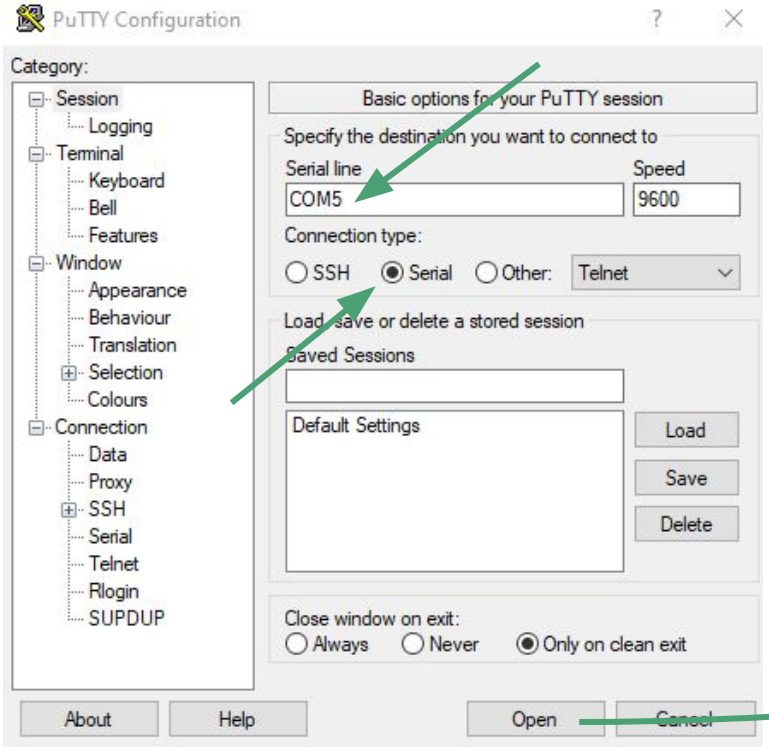
Cisco Access Point

Model: AIR-CAP3602I-E-K9

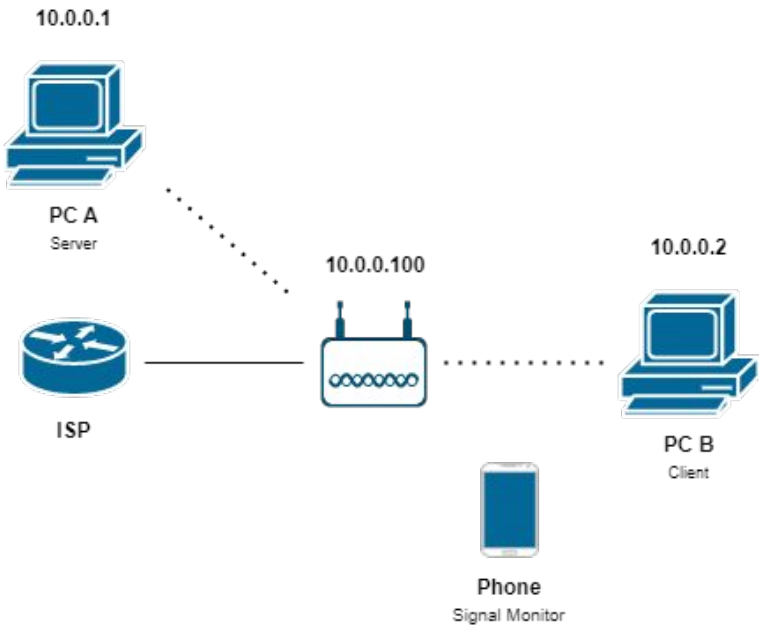
IEEE standard: 802.11n

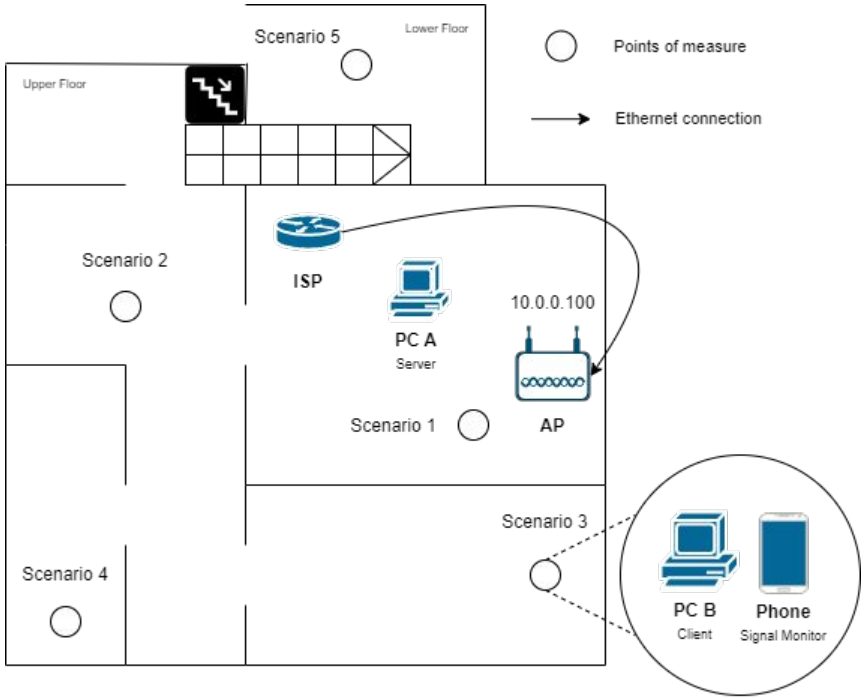
Dual Band: 2.4 GHz & 5 GHz

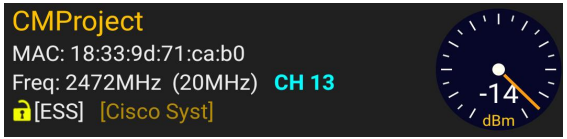
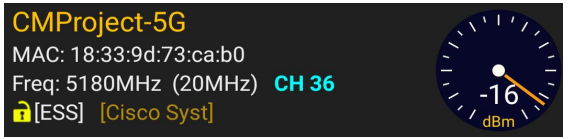
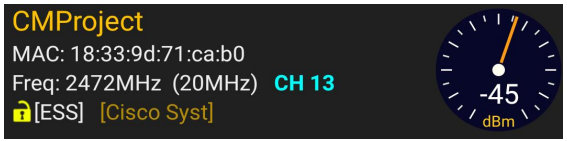
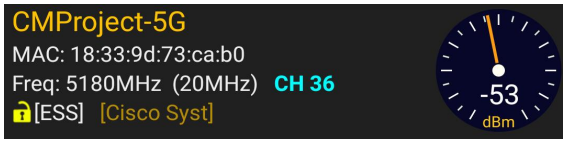
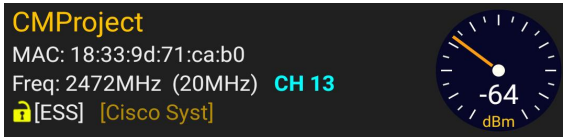
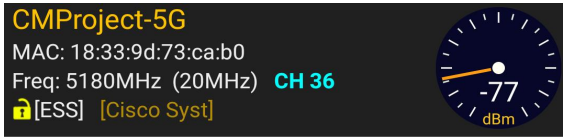
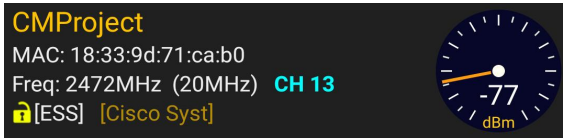
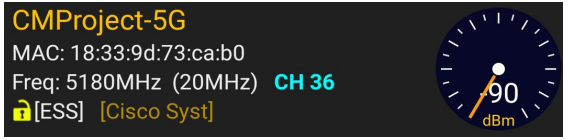
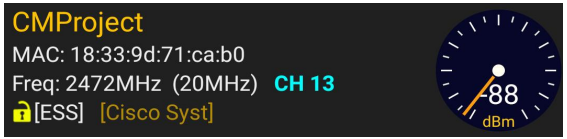
Access Point Configuration



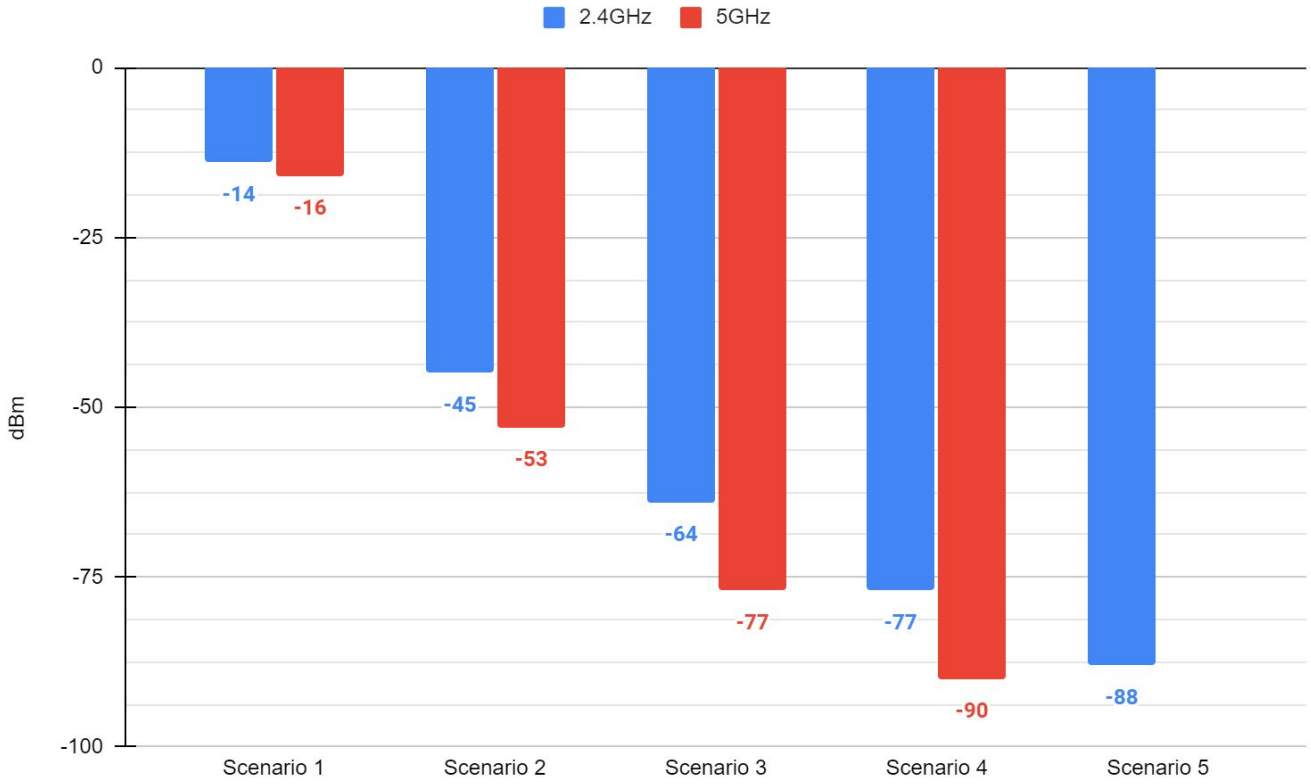
802.11 coverage and performance





	2.4GHz	5GHz
Scenario 1		
Scenario 2		
Scenario 3		
Scenario 4		
Scenario 5		

Signal Strength



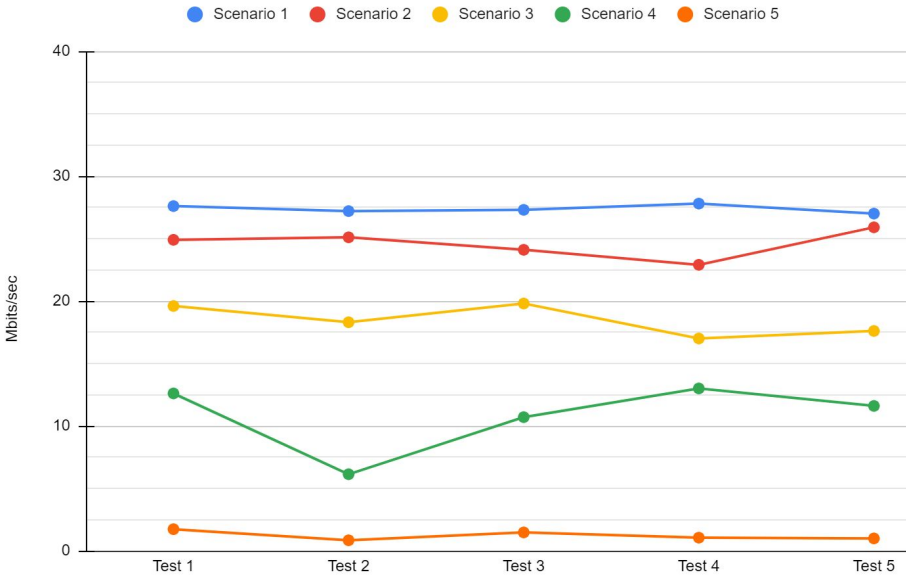
Signal Strength

```
> iperf3 -c 10.0.0.2 -t 20 --logfile scenario1-test1-5g.txt
```

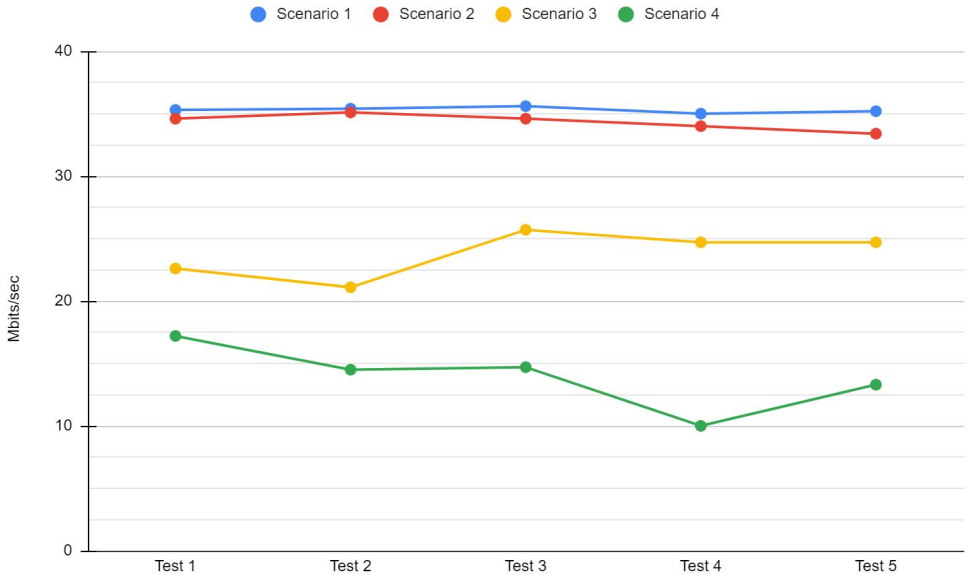
```
Connecting to host 10.0.1.4, port 5201
[  5] local 10.0.1.5 port 63897 connected to 10.0.1.4 port 5201
[ ID] Interval           Transfer     Bandwidth
[  5]   0.00-1.01   sec  4.38 MBytes  36.3 Mbits/sec
[  5]   1.01-2.01   sec  4.00 MBytes  33.8 Mbits/sec
[  5]   2.01-3.01   sec  3.88 MBytes  32.5 Mbits/sec
[  5]   3.01-4.00   sec  4.38 MBytes  36.8 Mbits/sec
[  5]   4.00-5.00   sec  4.25 MBytes  35.7 Mbits/sec
[  5]   5.00-6.01   sec  4.38 MBytes  36.2 Mbits/sec
[  5]   6.01-7.01   sec  4.38 MBytes  36.7 Mbits/sec
[  5]   7.01-8.01   sec  4.38 MBytes  36.7 Mbits/sec
[  5]   8.01-9.01   sec  4.12 MBytes  34.6 Mbits/sec
[  5]   9.01-10.01  sec  4.25 MBytes  36.0 Mbits/sec
[  5]  10.01-11.00  sec  4.38 MBytes  36.8 Mbits/sec
[  5]  11.00-12.00  sec  4.12 MBytes  34.6 Mbits/sec
[  5]  12.00-13.00  sec  4.12 MBytes  34.7 Mbits/sec
[  5]  13.00-14.00  sec  4.00 MBytes  33.4 Mbits/sec
[  5]  14.00-15.00  sec  4.12 MBytes  34.8 Mbits/sec
[  5]  15.00-16.01  sec  4.25 MBytes  35.3 Mbits/sec
[  5]  16.01-17.01  sec  4.25 MBytes  35.5 Mbits/sec
[  5]  17.01-18.00  sec  4.12 MBytes  35.0 Mbits/sec
[  5]  18.00-19.01  sec  4.25 MBytes  35.4 Mbits/sec
[  5]  19.01-20.01  sec  4.25 MBytes  35.8 Mbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth
[  5]   0.00-20.01  sec  84.2 MBytes  35.3 Mbits/sec                  sender
[  5]   0.00-20.01  sec  84.1 MBytes  35.2 Mbits/sec                  receiver

iperf Done.
```

Bandwidth

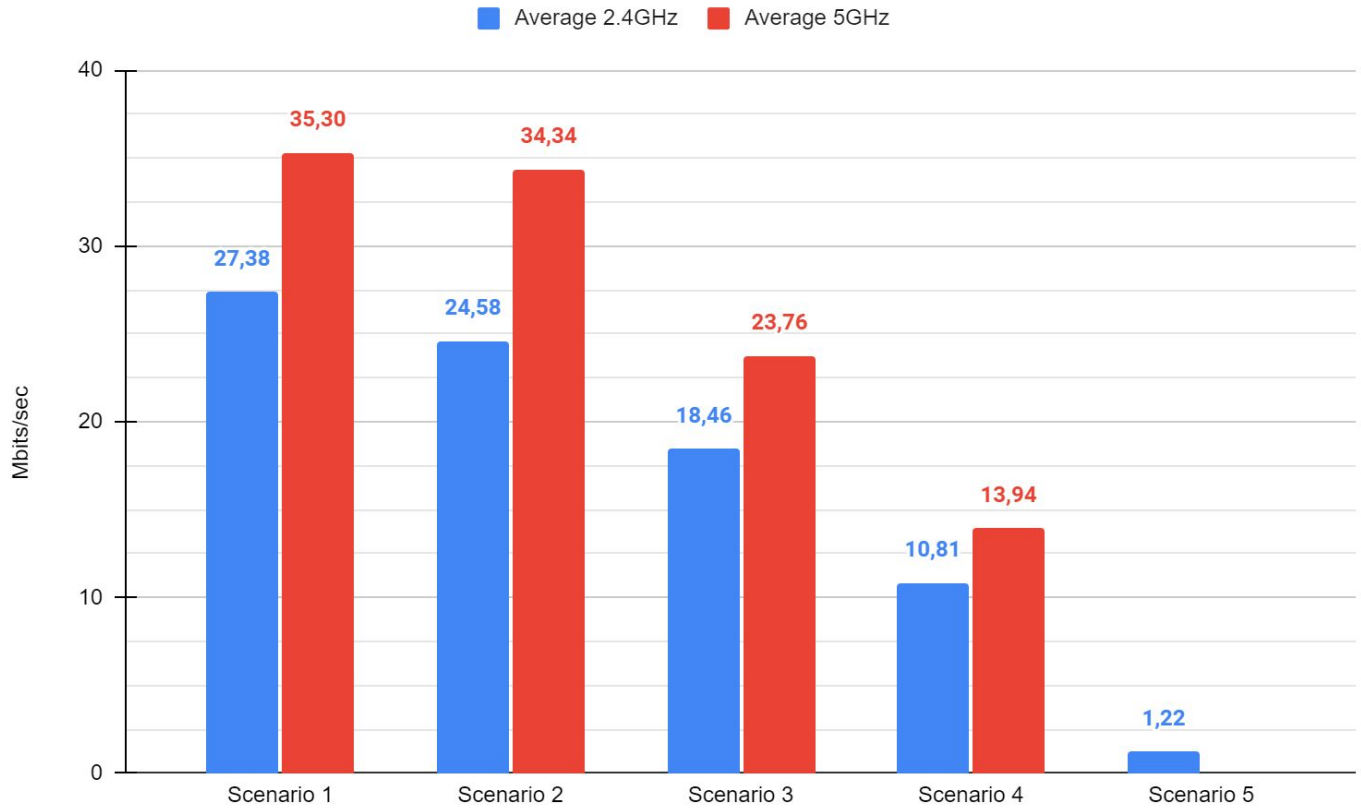
2.4GHz



5GHz

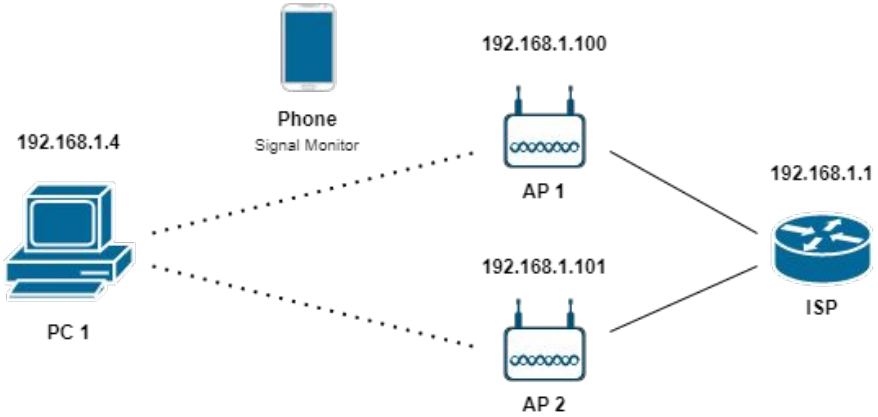


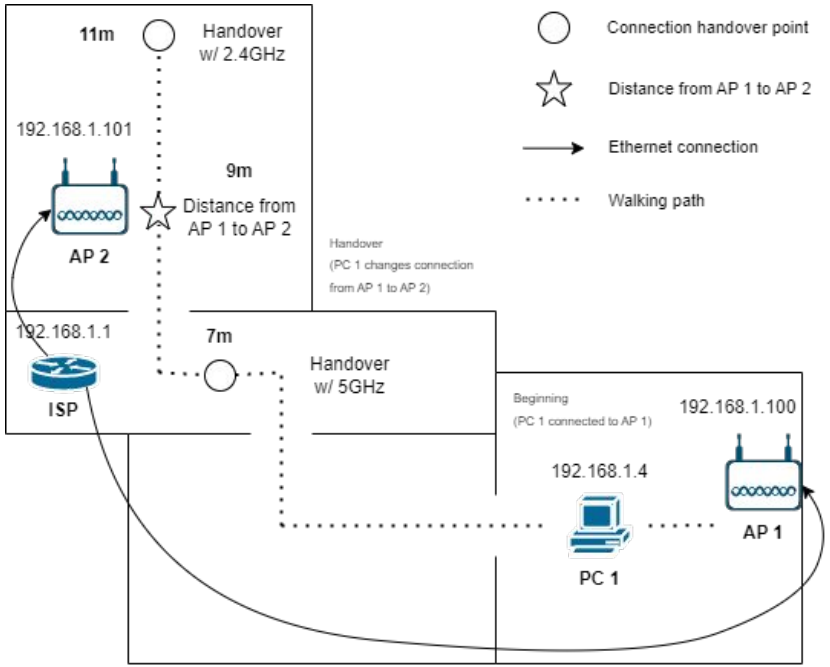
Bandwidth


Average 2.4GHz
Average 5GHz
Mbits/sec
40
30
20
10
0
35,30
34,34
27,38
24,58
23,76
18,46
13,94
10,81
1,22
Scenario 1
Scenario 2
Scenario 3
Scenario 4
Scenario 5

Bandwidth

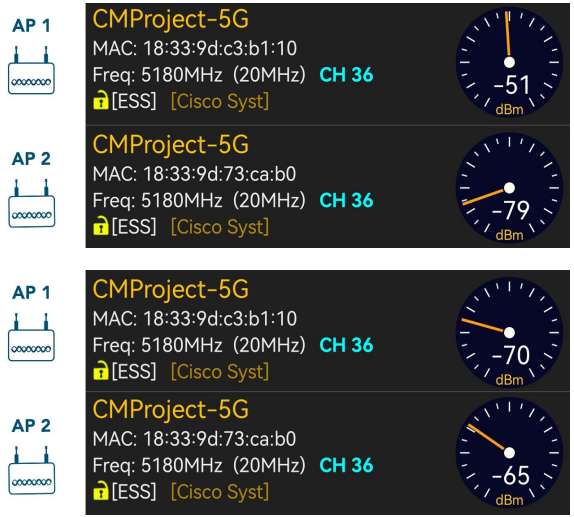
Roaming between APs





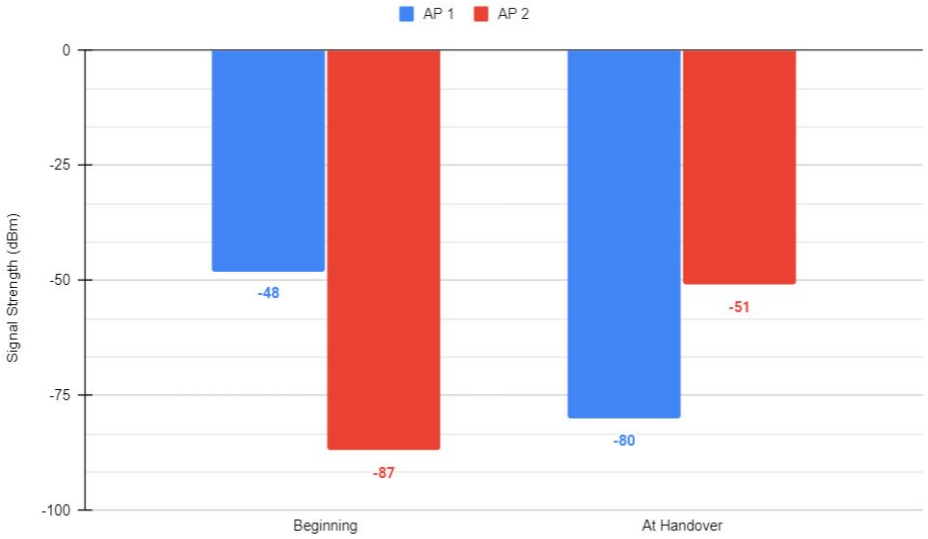
2.4GHz

5GHz

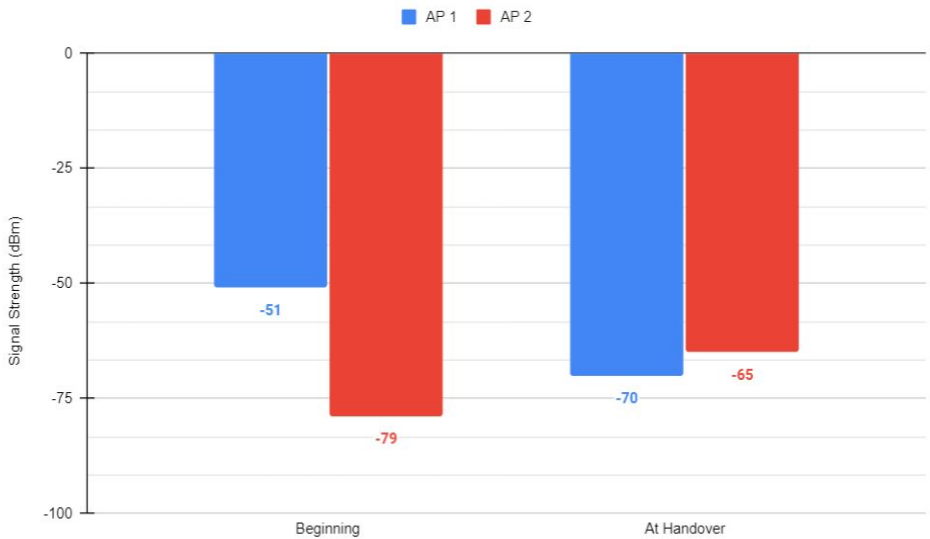


Roaming

Roaming 2.4GHz

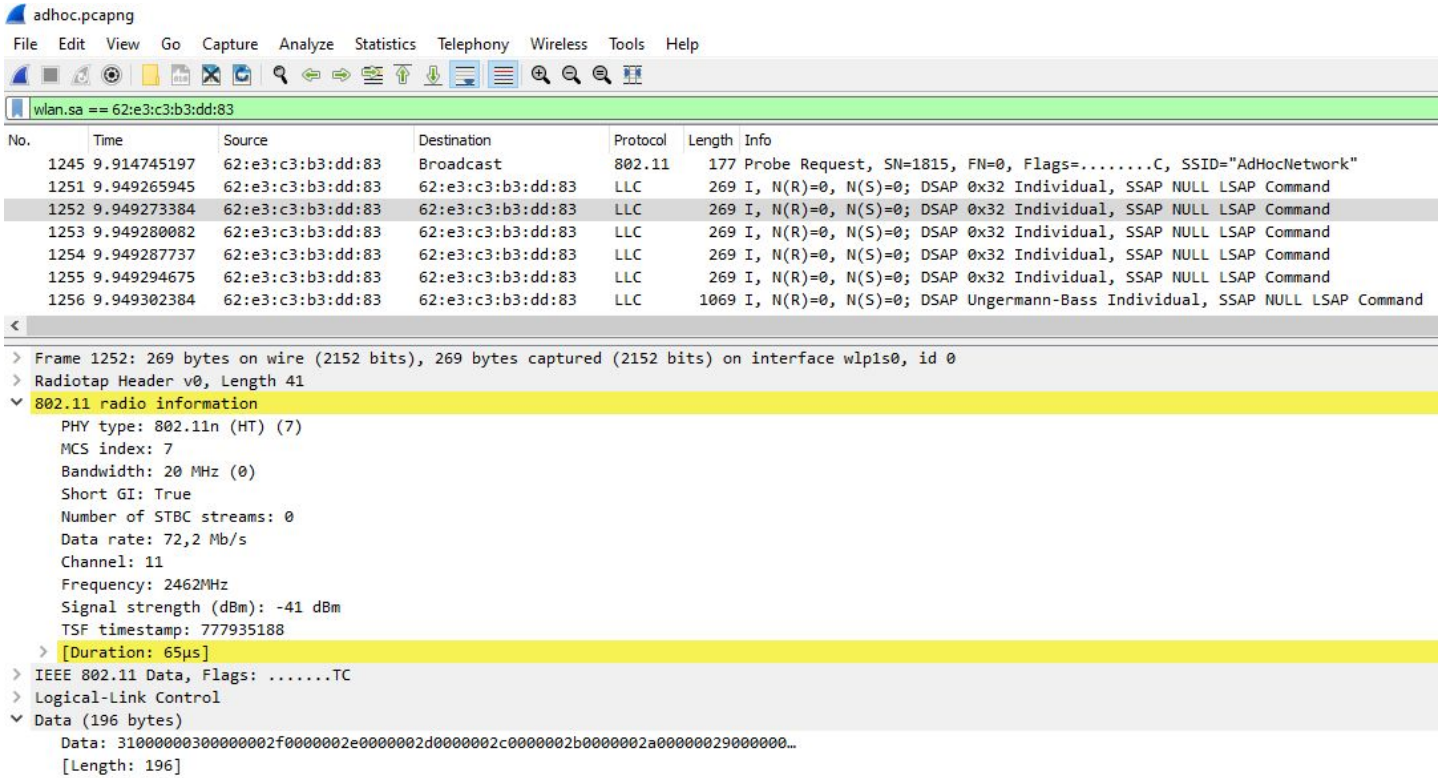


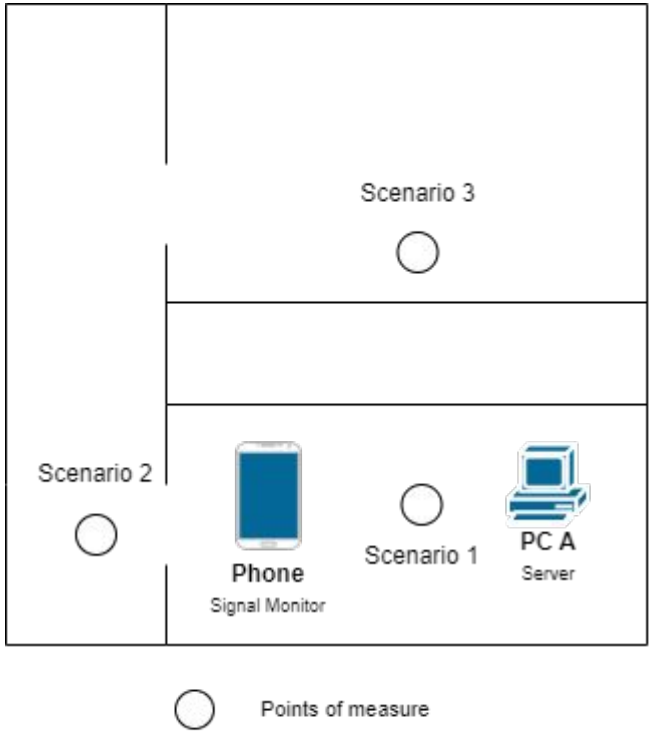
Roaming 5GHz



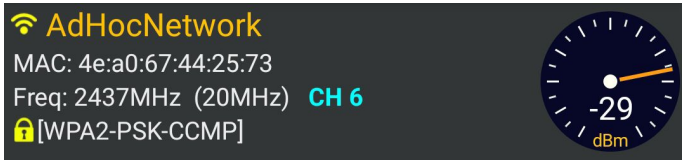
Roaming

Ad-hoc Network

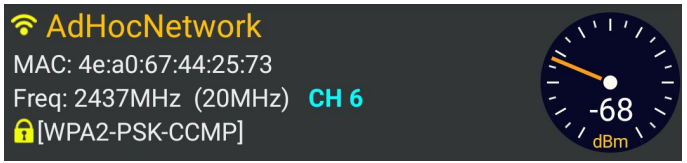




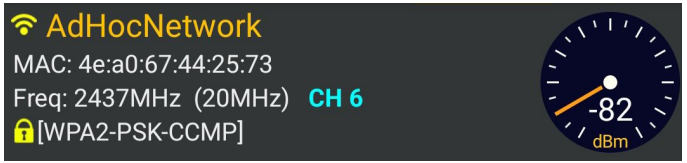
Scenario 1



Scenario 2

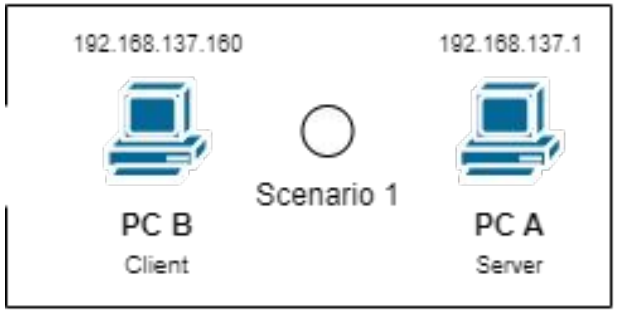


Scenario 3



Signal Strength

Ad-hoc Network

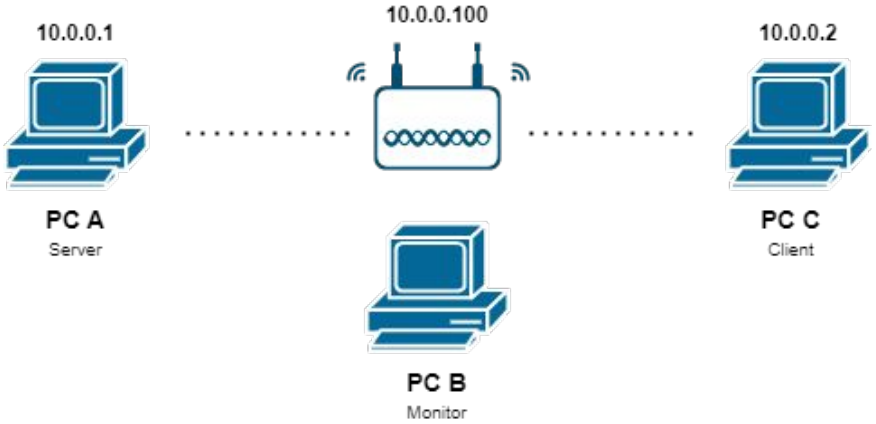


Scenario 1 Device as close as possible to the AP (< 1m)	
AP **average bandwidth**	**Ad-hoc** **average bandwidth**
27.38 Mbits/sec	31.64 Mbits/sec

Control Frames (not accomplished)

Why?

- Excessive amount of noise
- Need for monitor mode (Linux)
- Bugs on WiFi Jammer code



Thank you for your attention!

Questions?