ECE 430
Laura and Joseph
LAB 3

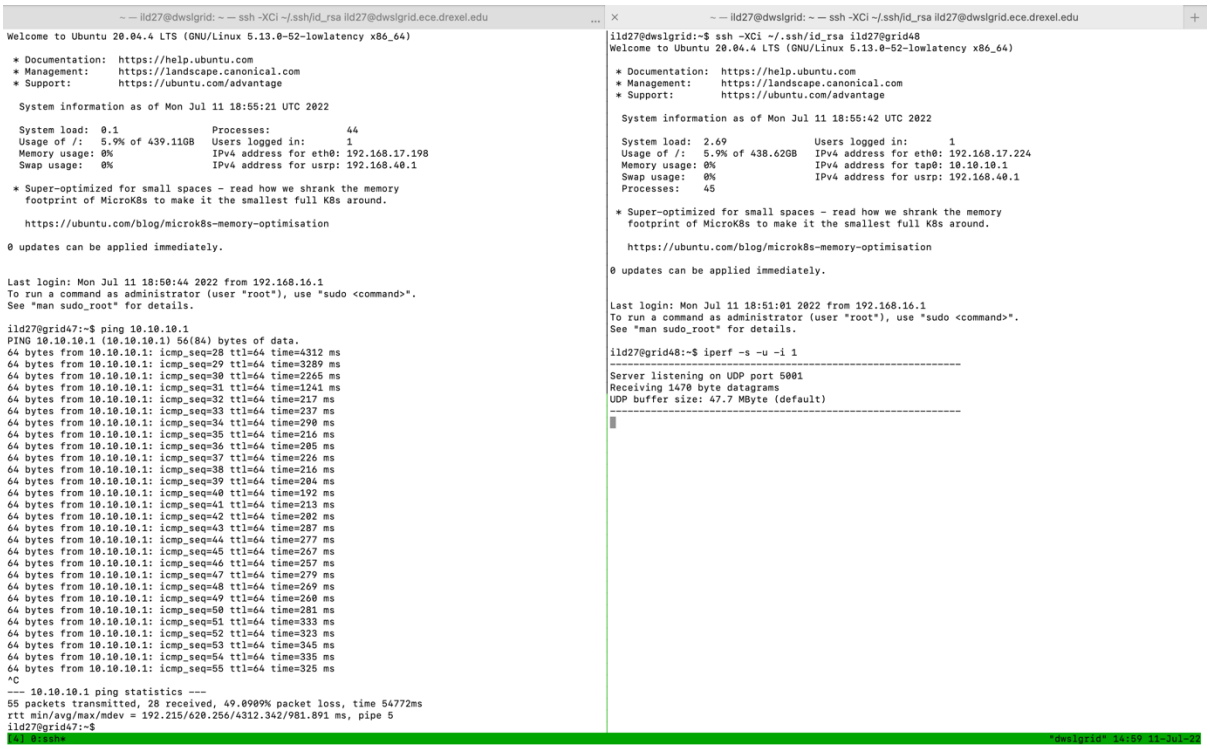


Figure 1: confirmation that ping works

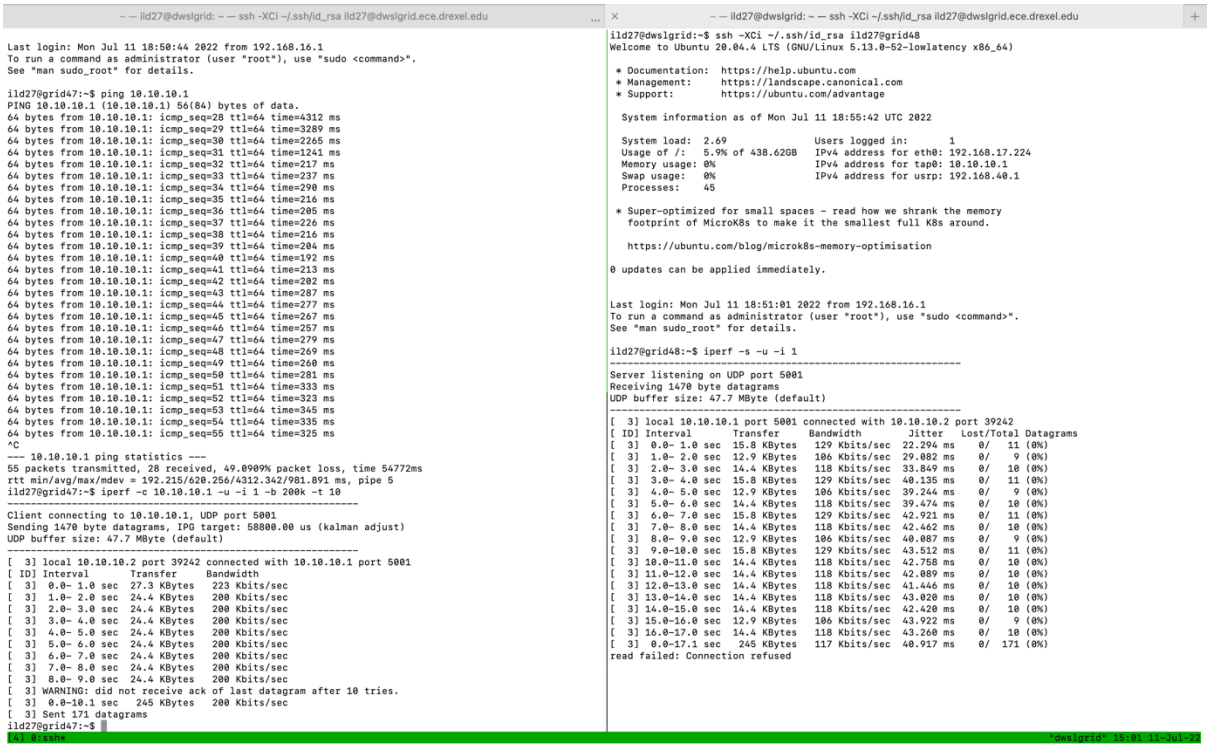


Figure 2: showing iperf is receiving data on the receiving node. Data rate reported is 129 Kbs.

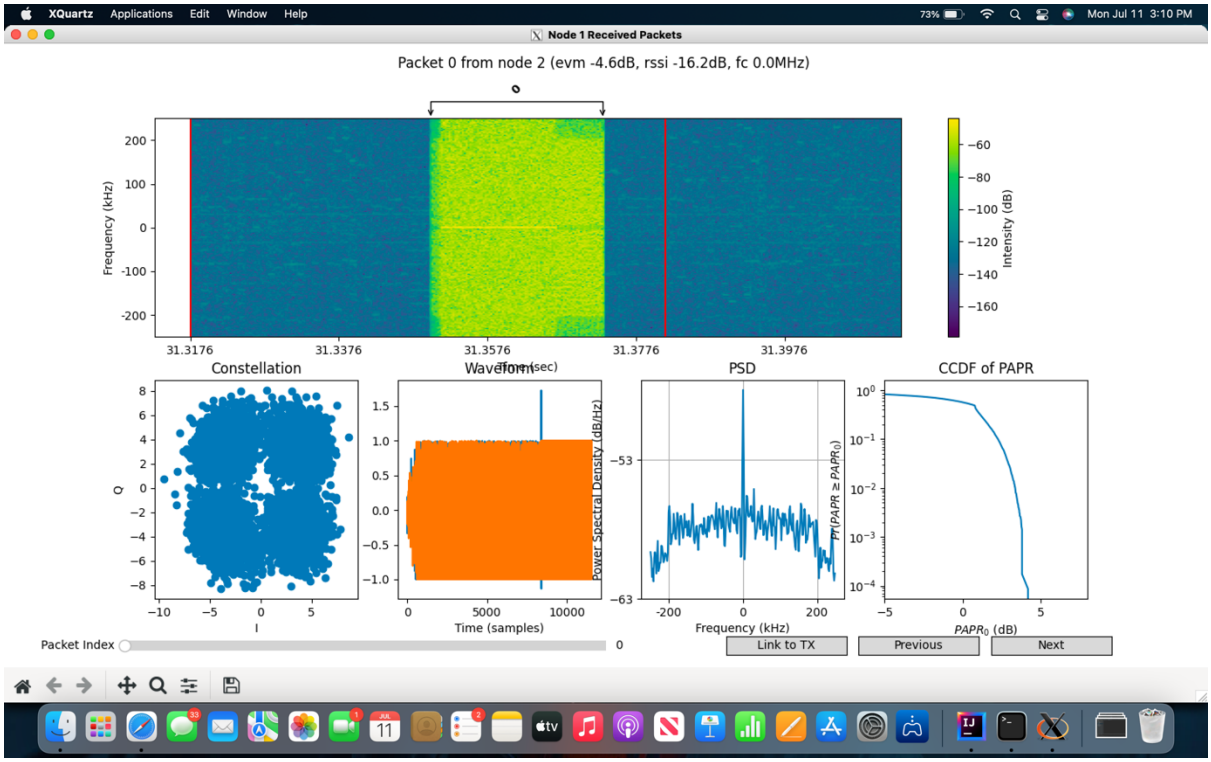


Figure 3: the signal spectrum and constellation corresponding to a received packet. The default modulation scheme of DragonRadio is 4quam and the default bandwidth is 200k

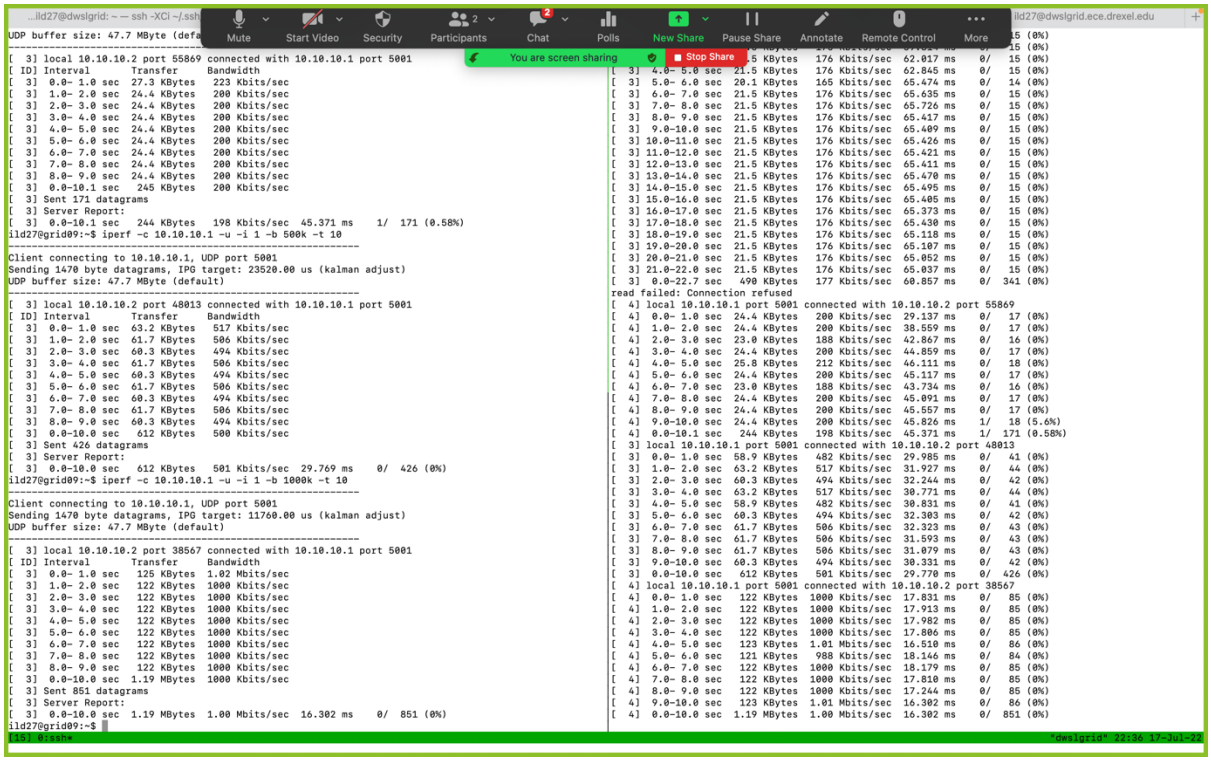


Figure 4: results when bandwidth is modified. When bandwidth reached 1000k, we get 1000Kbs data rate

Several tries were carried out, on both N210 and X310 radios (that were not next to each other) in order to get the red boxes; however, these were the same output every time.

Figure 5: aloha mac signal spectrum

```
ild27@grid09:~$ ping 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.
64 bytes from 10.10.10.1: icmp_seq=1 ttl=64 time=328 ms
64 bytes from 10.10.10.1: icmp_seq=3 ttl=64 time=1060 ms
64 bytes from 10.10.10.1: icmp_seq=5 ttl=64 time=416 ms
64 bytes from 10.10.10.1: icmp_seq=6 ttl=64 time=1489 ms
64 bytes from 10.10.10.1: icmp_seq=7 ttl=64 time=942 ms
64 bytes from 10.10.10.1: icmp_seq=8 ttl=64 time=791 ms
64 bytes from 10.10.10.1: icmp_seq=9 ttl=64 time=481 ms
64 bytes from 10.10.10.1: icmp_seq=10 ttl=64 time=631 ms
64 bytes from 10.10.10.1: icmp_seq=11 ttl=64 time=628 ms
64 bytes from 10.10.10.1: icmp_seq=12 ttl=64 time=1086 ms
64 bytes from 10.10.10.1: icmp_seq=13 ttl=64 time=3527 ms
64 bytes from 10.10.10.1: icmp_seq=14 ttl=64 time=2527 ms
64 bytes from 10.10.10.1: icmp_seq=15 ttl=64 time=1481 ms
64 bytes from 10.10.10.1: icmp_seq=16 ttl=64 time=457 ms
64 bytes from 10.10.10.1: icmp_seq=17 ttl=64 time=686 ms
64 bytes from 10.10.10.1: icmp_seq=18 ttl=64 time=301 ms
64 bytes from 10.10.10.1: icmp_seq=19 ttl=64 time=1141 ms
^C
--- 10.10.10.1 ping statistics ---
20 packets transmitted, 17 received, 15% packet loss, time 19184ms
rtt min/avg/max/mdev = 301.403/1057.242/3527.377/819.945 ms, pipe 4
ild27@grid09:~$
[15] 0:ssh*
```

Figure 6: ping for aloha mac

```
ild27@grid09:~$ ping 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.
64 bytes from 10.10.10.1: icmp_seq=1 ttl=64 time=233 ms
64 bytes from 10.10.10.1: icmp_seq=2 ttl=64 time=231 ms
64 bytes from 10.10.10.1: icmp_seq=3 ttl=64 time=222 ms
64 bytes from 10.10.10.1: icmp_seq=4 ttl=64 time=220 ms
64 bytes from 10.10.10.1: icmp_seq=5 ttl=64 time=142 ms
64 bytes from 10.10.10.1: icmp_seq=6 ttl=64 time=139 ms
64 bytes from 10.10.10.1: icmp_seq=7 ttl=64 time=213 ms
64 bytes from 10.10.10.1: icmp_seq=8 ttl=64 time=210 ms
64 bytes from 10.10.10.1: icmp_seq=9 ttl=64 time=208 ms
64 bytes from 10.10.10.1: icmp_seq=10 ttl=64 time=206 ms
64 bytes from 10.10.10.1: icmp_seq=11 ttl=64 time=204 ms
64 bytes from 10.10.10.1: icmp_seq=12 ttl=64 time=278 ms
64 bytes from 10.10.10.1: icmp_seq=13 ttl=64 time=276 ms
64 bytes from 10.10.10.1: icmp_seq=14 ttl=64 time=276 ms
64 bytes from 10.10.10.1: icmp_seq=15 ttl=64 time=269 ms
64 bytes from 10.10.10.1: icmp_seq=16 ttl=64 time=267 ms
64 bytes from 10.10.10.1: icmp_seq=17 ttl=64 time=267 ms
64 bytes from 10.10.10.1: icmp_seq=18 ttl=64 time=266 ms
64 bytes from 10.10.10.1: icmp_seq=19 ttl=64 time=265 ms
64 bytes from 10.10.10.1: icmp_seq=20 ttl=64 time=264 ms
64 bytes from 10.10.10.1: icmp_seq=21 ttl=64 time=262 ms
64 bytes from 10.10.10.1: icmp_seq=22 ttl=64 time=262 ms
64 bytes from 10.10.10.1: icmp_seq=23 ttl=64 time=261 ms
64 bytes from 10.10.10.1: icmp_seq=24 ttl=64 time=333 ms
64 bytes from 10.10.10.1: icmp_seq=25 ttl=64 time=333 ms
64 bytes from 10.10.10.1: icmp_seq=26 ttl=64 time=331 ms
64 bytes from 10.10.10.1: icmp_seq=27 ttl=64 time=325 ms
64 bytes from 10.10.10.1: icmp_seq=28 ttl=64 time=323 ms
64 bytes from 10.10.10.1: icmp_seq=29 ttl=64 time=323 ms
64 bytes from 10.10.10.1: icmp_seq=30 ttl=64 time=322 ms
64 bytes from 10.10.10.1: icmp_seq=31 ttl=64 time=321 ms
64 bytes from 10.10.10.1: icmp_seq=32 ttl=64 time=320 ms
64 bytes from 10.10.10.1: icmp_seq=33 ttl=64 time=319 ms
64 bytes from 10.10.10.1: icmp_seq=34 ttl=64 time=318 ms
64 bytes from 10.10.10.1: icmp_seq=35 ttl=64 time=317 ms
64 bytes from 10.10.10.1: icmp_seq=36 ttl=64 time=316 ms
64 bytes from 10.10.10.1: icmp_seq=37 ttl=64 time=309 ms
64 bytes from 10.10.10.1: icmp_seq=38 ttl=64 time=158 ms
64 bytes from 10.10.10.1: icmp_seq=39 ttl=64 time=230 ms
64 bytes from 10.10.10.1: icmp_seq=40 ttl=64 time=229 ms
^C
--- 10.10.10.1 ping statistics ---
40 packets transmitted, 40 received, 0% packet loss, time 39017ms
rtt min/avg/max/mdev = 139.256/264.210/333.314/53.383 ms
ild27@grid09:~$
[15] 0:ssh*
```

Figure 7: ping for tdma mac

Modifications to sdr-class-radio.py :
(assuming we only have 2 nodes)

a)

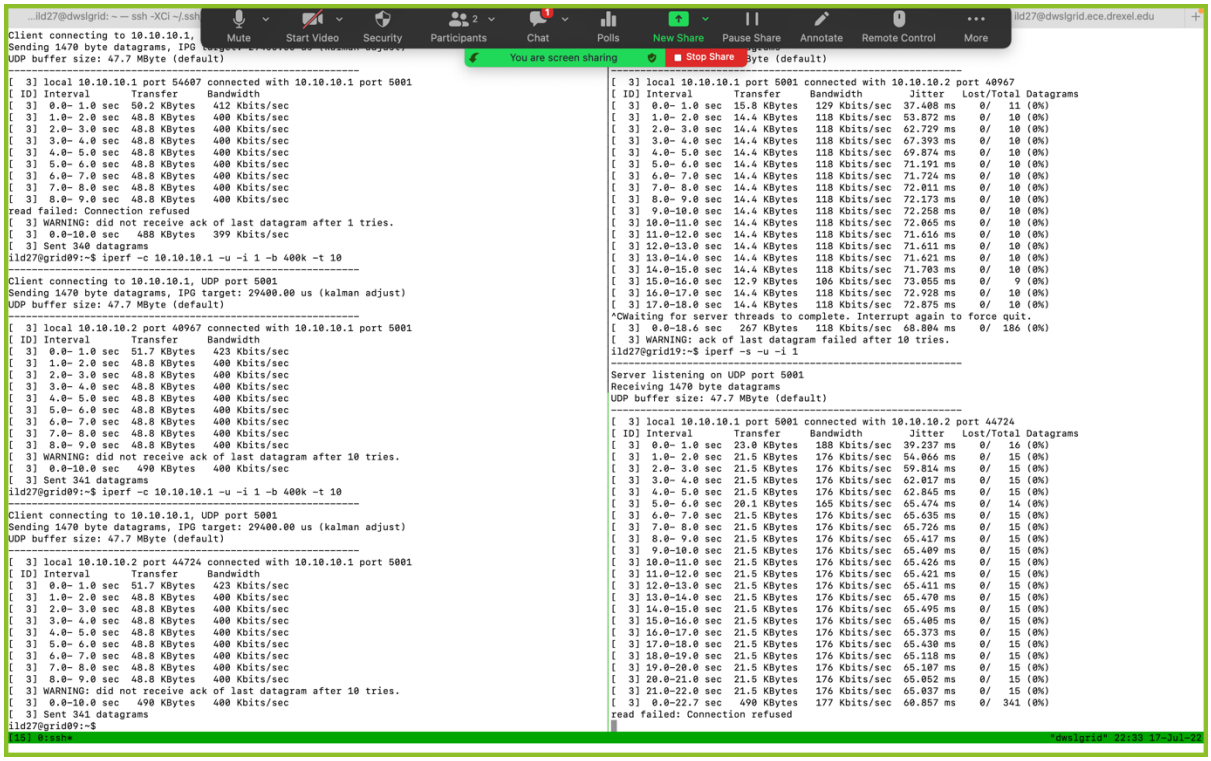
```
In [4]: nodes = sorted([1,2])
   ...: nslots = 10
   ...: sched = np.zeros((1, nslots), dtype=int)
   ...:
   ...: for i in range(0, nslots):
   ...:     sched[0][i] = nodes[i%2]
```

Name	Type	Size	
i	int	1	9
nodes	list	2	[1, 2]
nslots	int	1	10
sched	Array of int32	(1, 10)	[[1 2 1 2 1 2 1 2 1 2]]

b)

```
In [6]: nodes = sorted([1,2])
   ...: nslots = 10
   ...: sched = np.zeros((1, nslots), dtype=int)
   ...:
   ...: for i in range(0, nslots):
   ...:     if (i<5):
   ...:         sched[0][i] = nodes[0]
   ...:     else:
   ...:         sched[0][i] = nodes[1]
```

Name	Type	Size	
i	int	1	9
nodes	list	2	[1, 2]
nslots	int	1	10
sched	Array of int32	(1, 10)	[[1 1 1 1 1 2 2 2 2 2]]



Checkpoint: results when slot size iz modified. At 0.05 and 0.1