APRICOT 2010 wifi network tuning

APRICOT 2010
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Three steps for wifi happiness

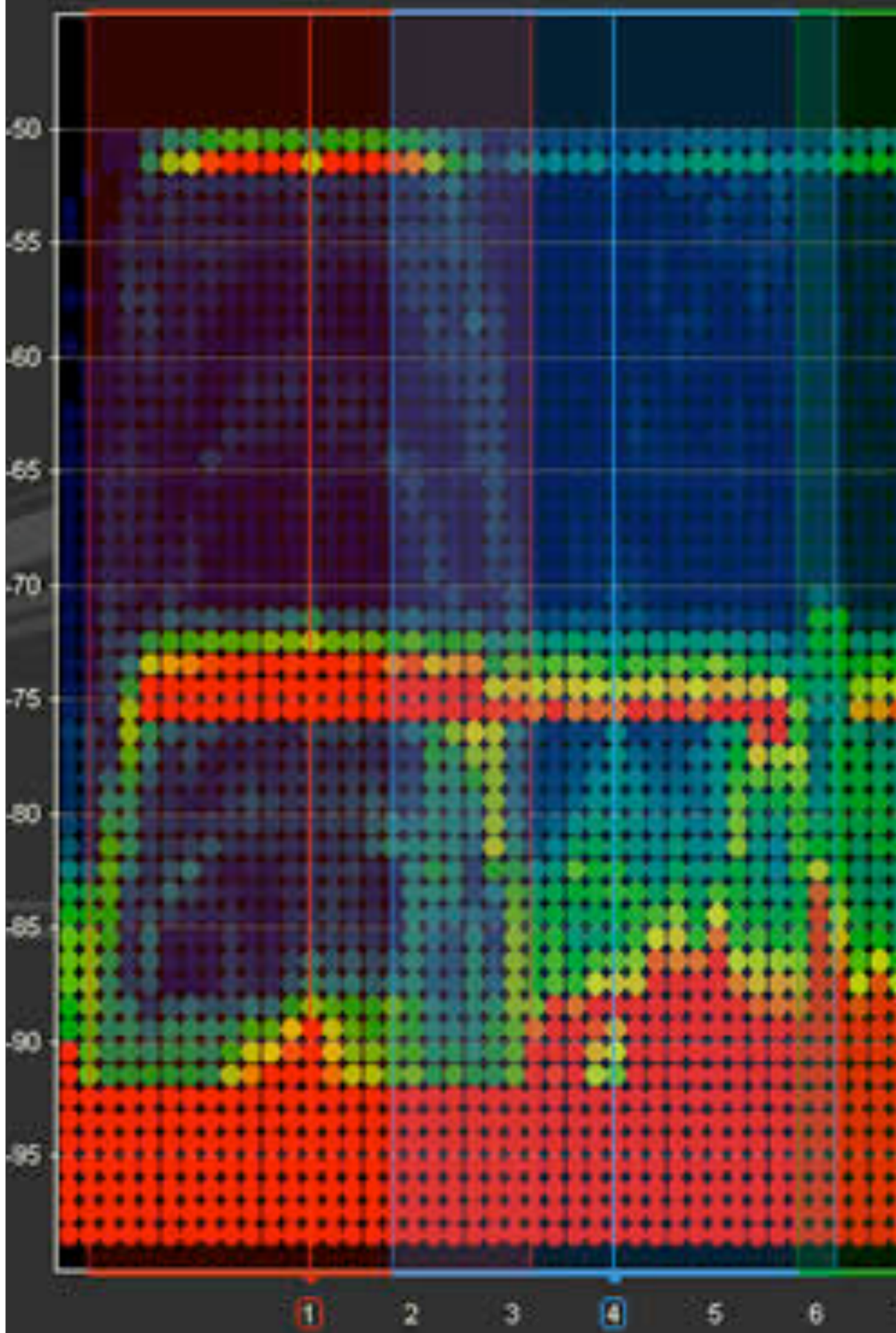
- Wifi for high density users can be very difficult
- You could spend much time on design, equipment, and testing - but there's just four things you really need to make happy wifi:
    - Use professional grade APs, NOT consumer grade
        - Consumer: 1-10 associations, Professional: 70-100 associations
    - Site survey, think about antena types
    - Use non-overlapping channels
    - Turn power levels right down

1. Site Survey

- Look at each room
- Place APs as far apart from each other as possible
- Low/medium density - place them high
- High density - place them low so people block the RF between APs
- Check for existing APs in the building. Turn them off if possible

2. Use Non-Overlapping Channels

- 802.11b/g - use ONLY channels 1,6,11
- 802.11a - provides an additional 19 non-overlapping channels. Regulations in most Asian countries limit to just four or five :(
- Use lots of 802.11a (even four or five is better than three)
- Try to prevent any locations from seeing multiple APs on the same channel

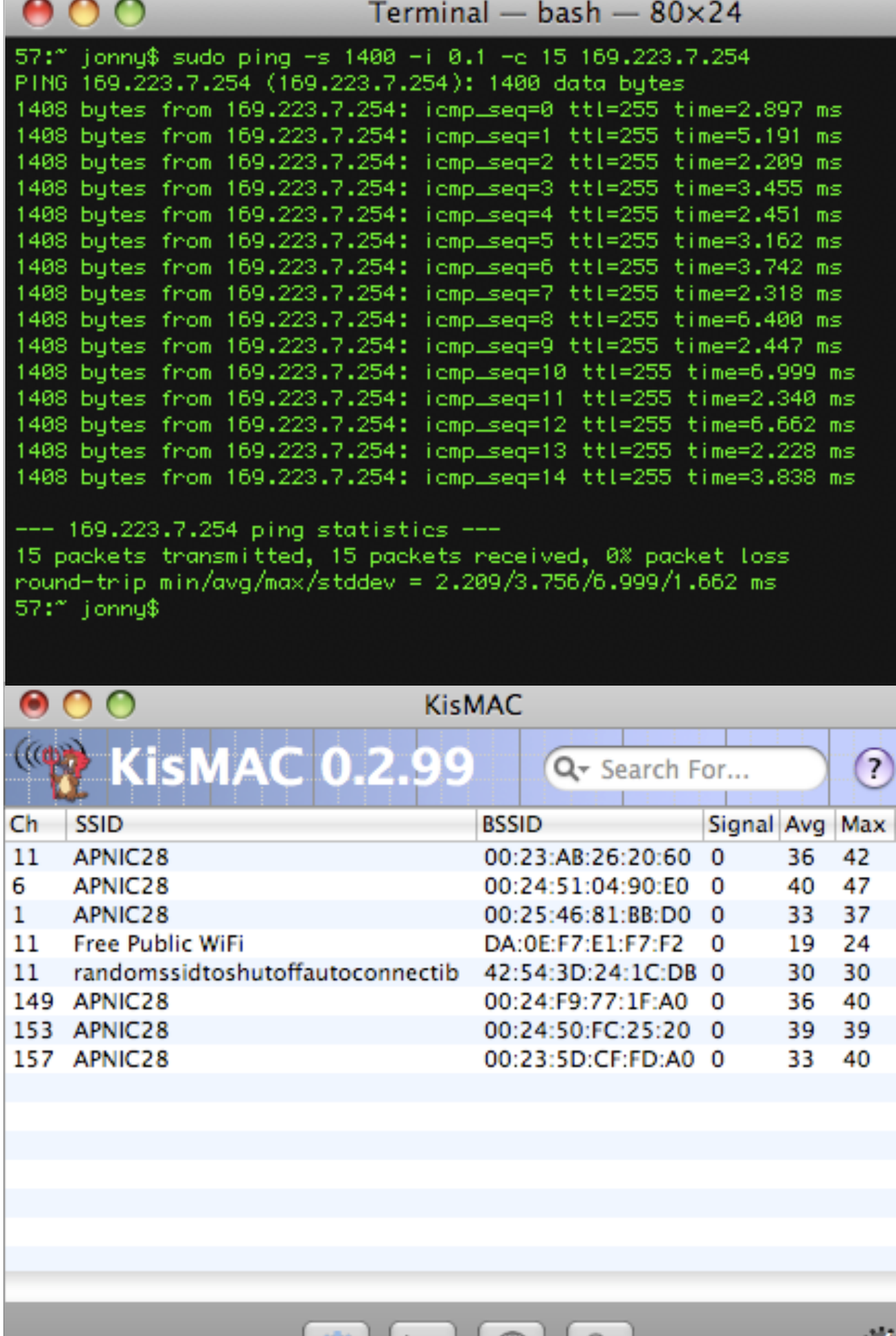


3. Turn power down!

- Only need 2 - 5dBm tx power
- That’s not much!
- Reduces RF noise in the room

Simple Tests

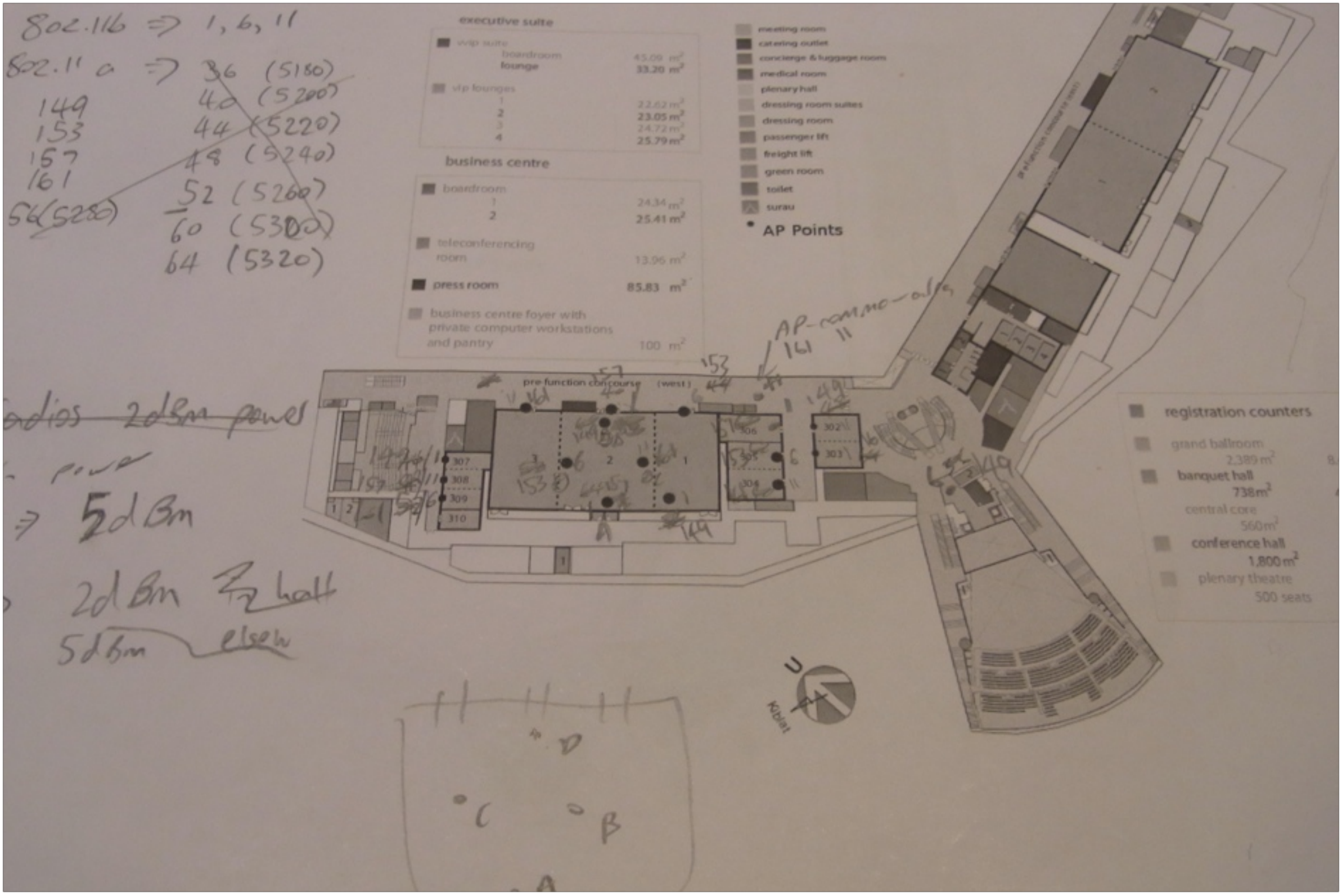
- Ping across the local LAN - look for consistent and low RTT
- Use wireless scanner to check APs and their power levels
- Check all around the venue
- Confirm things are good when people and their wireless devices are present



Here in the KLCC

- The antennas didn't arrive in time so we had a mix of antenna types
- Mark and his team decided on AP locations primarily based on cabling availability. Number of APs based on room capacity
    - My rule of thumb: 50 *seats* per radio
- Best guess at power levels and channels
    - Most 802.11bg radios at 2dBm power
    - Most 802.11a radios at 5dBm power
- Tune via trial and error

Antennas and AP types



Initial ‘best guess’ layout, Level 3 KLCC

computer workstations

y

100 m^2

pre-function concourse (west)

3

2

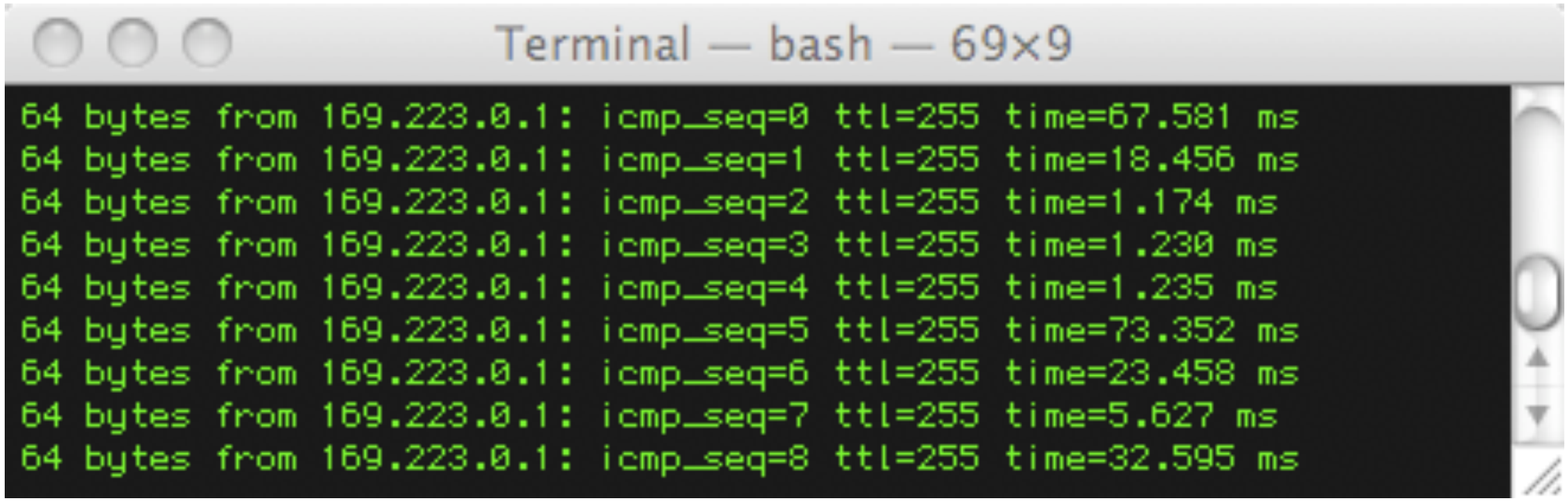
1

306

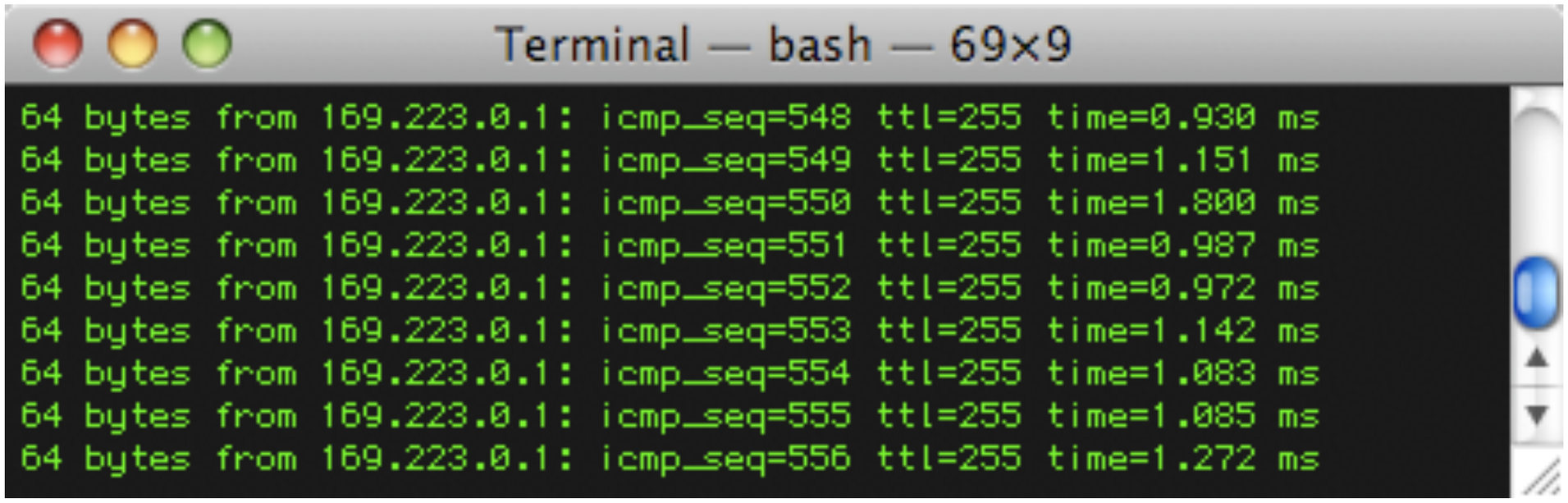
305

304

1



bad wireless



good wireless

Terminal — bash — 97×23

```
19:~ jonny$ while true; do sudo airport -s; echo ; sleep 1; done
                            SSID BSSID             RSSI CHANNEL SECURITY (auth/unicast/group)
                  APRICOT-2010-b 00:26:99:a1:89:90 -86  6       NONE
                           Guest 00:11:93:1f:01:20 -84  10      NONE
                  APRICOT-2010-b 00:26:99:90:fe:d0 -74  11      NONE
                           Guest 00:11:93:1f:05:21 -67  10      NONE
                   FREE-INTERNET 00:11:93:1e:fc:20 -87  7       WEP
                  APRICOT-2010-b 00:3a:98:0b:44:d0 -79  1       NONE
                    APRICOT-2010 00:26:99:8f:52:40 -80  149     NONE
                    APRICOT-2010 00:3a:98:0a:a5:b0 -69  161     NONE

^C
19:~ jonny$
```

Terminal — bash — 97×23

```
                             SSID BSSID             RSSI CHANNEL SECURITY (auth/unicast/group)
                           Guest 00:11:93:1e:ff:d0 -90  4       NONE
                           Guest 00:11:93:1e:fe:20 -86  11      NONE
                    APRICOT-2010 00:24:97:c3:27:10 -73  165     NONE
                  APRICOT-2010-b 00:24:97:b7:7b:90 -71  11      NONE
                           Guest 00:11:93:1f:12:40 -66  8       NONE
                           Guest 00:11:93:1f:0c:d1 -74  7       NONE
                  APRICOT-2010-b 00:24:97:b7:96:c0 -72  6       NONE
                          mobile 00:11:93:1e:ff:d3 -88  4       WEP
                           Guest 00:11:93:1e:ff:11 -85  5       NONE
                  APRICOT-2010-b 00:24:97:b7:7c:20 -84  1       NONE
                           Guest 00:11:93:1f:0c:81 -93  1       NONE
                           Guest 00:11:93:1e:fd:90 -60  2       NONE
                  APRICOT-2010-b 00:24:97:b7:8e:a0 -69  1       NONE
                    APRICOT-2010 00:24:97:c2:e6:30 -76  157     NONE
                    APRICOT-2010 00:24:c4:85:eb:20 -73  153     NONE
                    APRICOT-2010 00:24:97:c3:19:f0 -71  149     NONE

1 IBSS network found:
                             SSID BSSID             RSSI CHANNEL SECURITY (auth/unicast/group)
                  Free Public WiFi aa:0c:a6:05:9c:e4 -79  10      NONE
```

Useful but hidden Airport tool on Macs

- For me it's in /System/Library/PrivateFrameworks/Apple80211.framewoek/Versions/Current/Resources/airport

- Not well documented and may be dangerous, so be careful

Terminal — bash — 107×22

```
184:~ jonny$ airport -h
airport AirPort v.528.1 (528.1.0)
Supported arguments:
 -z         --disassociate       Disassociate from any network
 -i[<arg>] --ibss=[<arg>]        Create IBSS
 -x         --xml                Print info as XML
 -s[<arg>] --scan=[<arg>]        Perform a wireless broadcast scan.
                                    Will perform a directed scan if the optional <arg> is provided
 -r<arg>    --repeats=<arg>      Repeat the command the specified number of times
 -A[<arg>] --associate=[<arg>]   Associate to network.
                                    Will prompt for network name if arg is not specified
                                    and if necessary, for a password if the network is using WEP or WPA.
                                    The following additional arguments may be specified with this command:
                                   --bssid=<arg>     Specify BSSID to associate with
                                   --password=<arg>  Specify a WEP key or WPA password
 -I         --getinfo            Print current wireless status, e.g. signal info, BSSID, port type etc.
 -P<arg>    --psk=<arg>          Create PSK from specified pass phrase and SSID.
                                    The following additional arguments must be specified with this command:
                                   --ssid=<arg>      Specify SSID when creating a PSK
 -c[<arg>] --channel=[<arg>]     Set arbitrary channel on the card
 -h         --help               Show this help
184:~ jonny$
```