How to Avoid Wireless Interference

Howard Preston

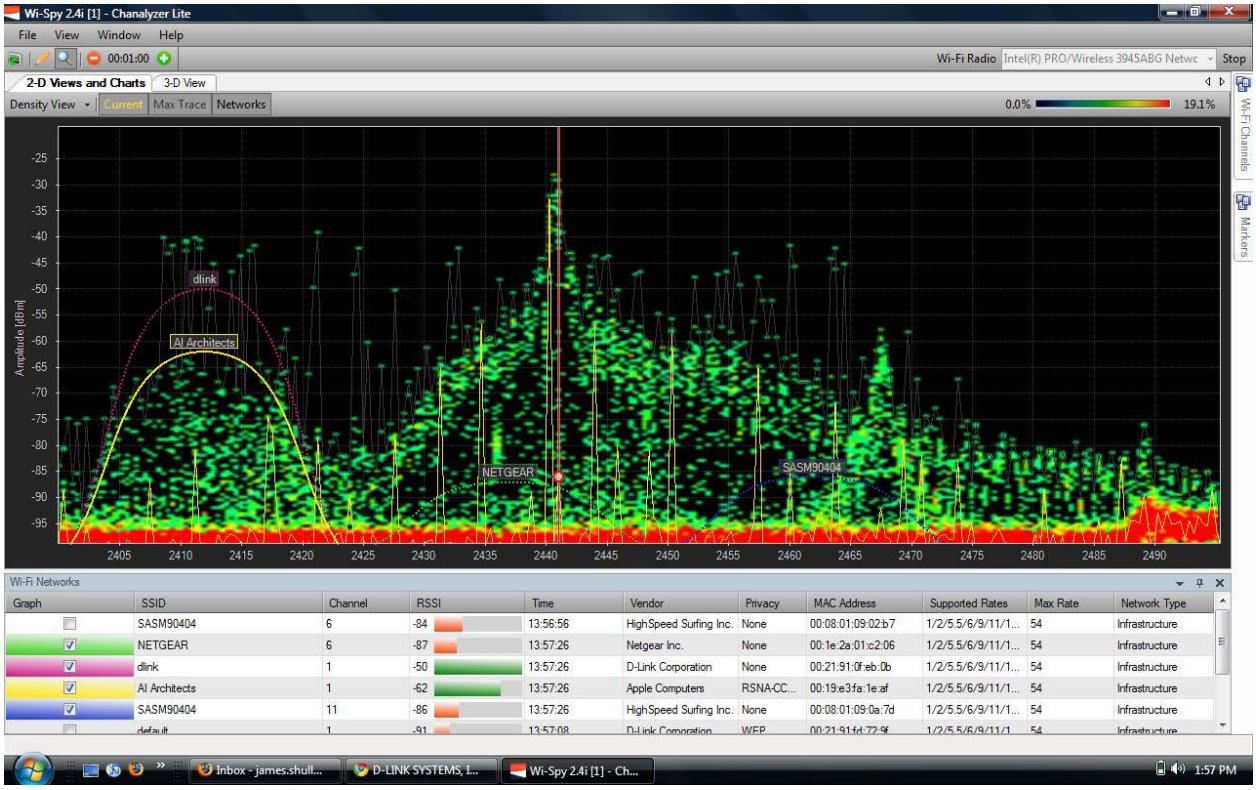
Preston Cinema Systems

7/25/2009

How to Avoid Wireless Interference

The best way to avoid interference is to determine which other devices are using the 2.4 GHz band, and choose a clear channel for the FI+Z. A spectrum analyzer provides a graphical display of radio signals, showing the strength of the signals versus their frequency or channel. Inexpensive analyzers and software have recently become available which allow any camera assistant to survey a site for 2.4 GHz activity. The operation of these devices is outlined below.

1. Wi-Spy 2.4i is an inexpensive USB based device that is used with either MAC's or PC's. Wi-Spy works in conjunction with Chanalyzer Lite software to give a picture of the activity on the 2.4 GHz band. This device is able to detect not only WiFi devices but other potential interferers like wireless microphones, video assist transmitters, Bluetooth devices, other wireless lens/camera controls, and microwave ovens to name just a few. A sample display appears below.



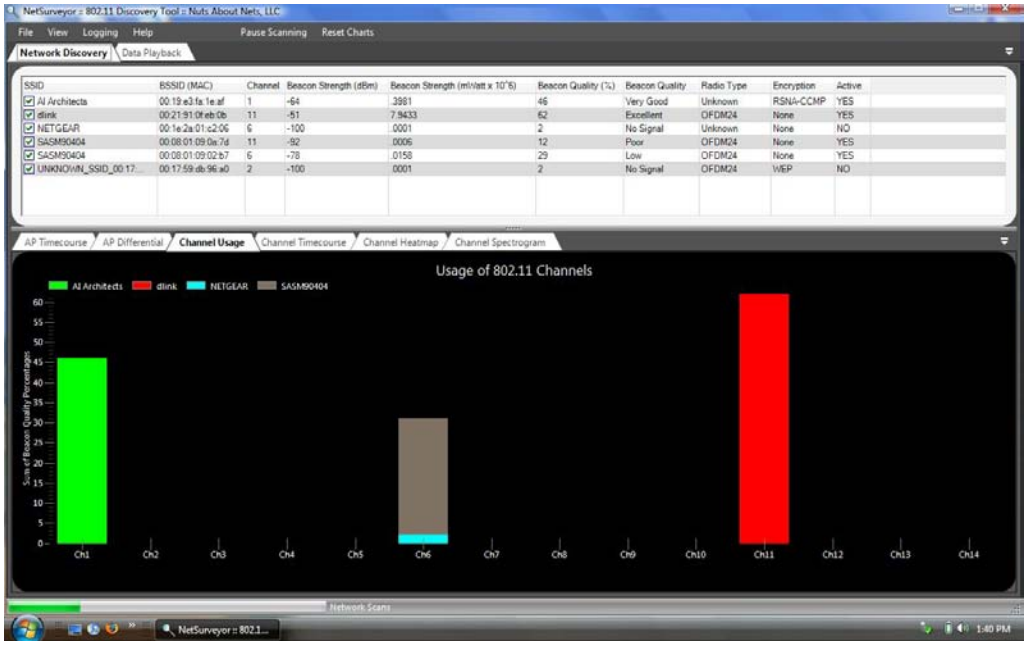
The display shows the amplitude of the signals along the vertical axis – stronger signals have higher peaks – and frequency in GHz along the horizontal axis. The frequency range is from 2.400 GHz to 2.500 GHz. In the US, the 2.4 GHz ISM band is from 2.400 to 2.4835 GHz.

The displayed information is used to choose an FI+Z channel which is as far away from other emitters as possible. In the example shown, the spectrum is relatively clear from 2.42 – 2.43 GHz and above 2.47

GHz. Choosing a FI+Z channel in either of those frequency ranges would avoid interference.

2. Programs are available which use the existing Wi-Fi cards installed in the user's computer to display occupied Wi-Fi channels. Unfortunately, these programs can only find Wi-Fi devices, not other types of emitters which may be present on set. Some of the available programs are:
    a. For PC only
        - http://www.metageek.net/products/inssider
        - http://downloads.digitaltrends.com/detail/602371/netsurveyor
        - http://www.nutsaboutnets.com/performance-wifi/products/netsurveyor-network-discovery.htm
    b. For MAX OSX:
    - http://code.google.com/p/airmoose/
    - http://www.macstumbler.com/

The Net Surveyor displays the most important information for indentifying potential WiFi interferers: their SSID, channel and signal strength as shown below.



2. Canary Wireless (http://www.canarywireless.com/canary/) makes an inexpensive hand held device which displays nearby Wi-Fi devices, showing their channel number, signal strength and SSID.

The tools described above are very effective in eliminating the most common sources of interference. They cannot be used to find potential interferers which operate outside of the 2.4 GHZ band.

Out of band interference occurs when the power level from the interferer overloads the sensitive amplifier used in the receiver section of the FI+Z wireless transceiver. Examples of such interferers include airport radar and some microwave point-to-point communication systems.

The air traffic control radar at civilian airports have peak powers up to 50,000 watts, while military radar uses up to a megawatt. The typical symptom of radar interference is periodic loss of signal corresponding to the sweep of the radar antenna. If you expect to operate near a high powered radar installation make sure you have a command cable available to provide a hard-wire back up.

Reference Material

1. FI+Z channels

Channel#	GHz	Channel#	GHz	Channel	GHz
0	2.4120	**10**	2.4310	**20**	2.4500
1	2.4139	**11**	2.4329	**21**	2.4519
2	2.4158	**12**	2.4348	**22**	2.4539
3	2.4177	**13**	2.4367	**23**	2.4559
4	2.4196	**14**	2.4386	**24**	2.4579
5	2.4215	**15**	2.4405	**25**	2.4599
6	2.4234	**16**	2.4424	**26**	2.4619
7	2.4253	**17**	2.4443	**27**	2.4639
8	2.4272	**18**	2.4462	**28**	2.4659
9	2.4291	**19**	2.4481	**29**	2.4679

2. WiFi Channels

Channel Number	Lower Frequency	Center Frequency	Upper Frequency
1	2 401	2 412	2 423
2	2 404	2 417	2 428
3	2 411	2 422	2 433
4	2 416	2 427	2 438
5	2 421	2 432	2 443
6	2 426	2 437	2 448
7	2 431	2 442	2 453
8	2 436	2 447	2 458
9	2 441	2 452	2 463
10	2 451	2 457	2 468
11	2 451	2 462	2 473
12	2 456	2 467	2 478
13	2 461	2 472	2 483
14	2 473	2 484	2 495