

2.4GHz Ham Radio with a Laptop

WCARC April 4, 2006

by Rick Bandla (VE3CVG)

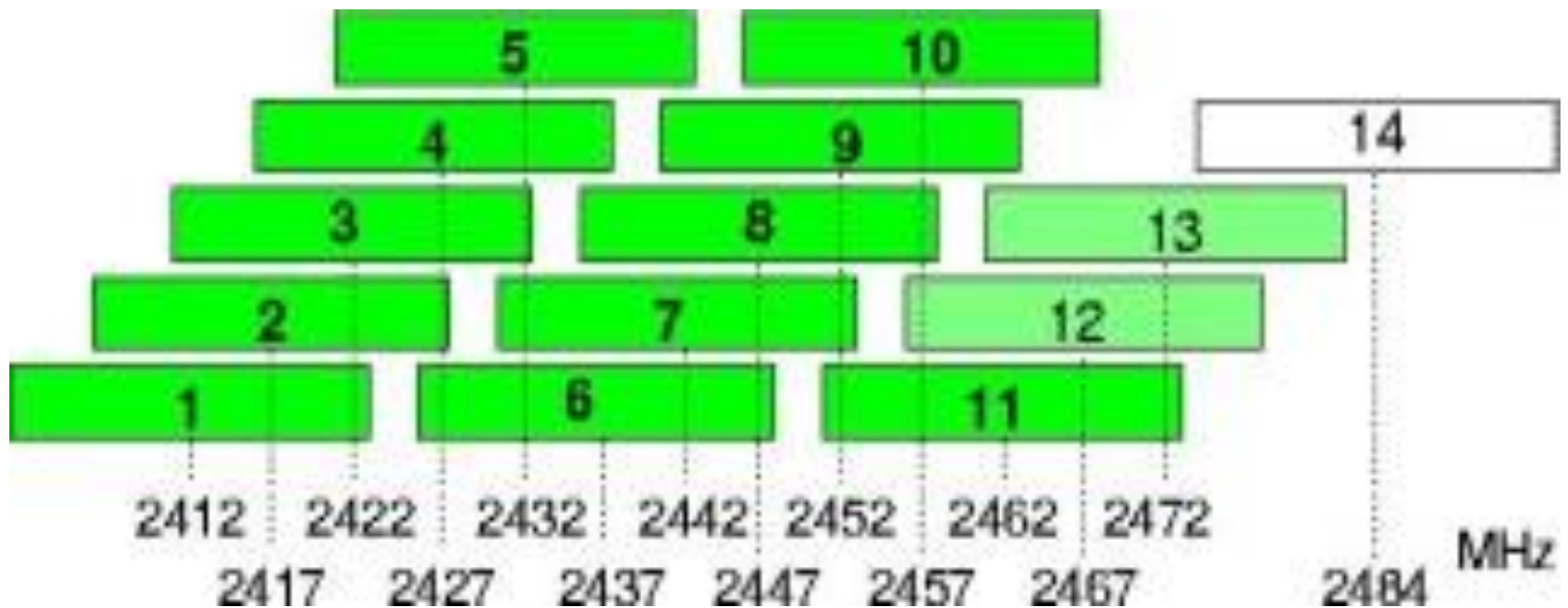
and Tom Zinck (VA3NFA)

802.11b & 802.11g

- 14 overlapping, staggered, channels with center frequencies 5 MHz apart
- 802.11b signal must be attenuated by at least 30 dB from its peak energy at ± 11 MHz from the center frequency, and at least 50 dB from its peak energy at ± 22 MHz
- 802.11b throughput is about 11mbit/s with fallback based on signal strength
- 802.11g throughput is 54mbit/s. Similar to 802.11a (on 5.8GHz). Uses orthogonal frequency division multiplexing (OFDM)
- 802.11b is compatible with 802.11g but slows it down.

802.11b & g Frequencies

- Amateur Radio Band is 2300MHz – 2450MHz
- 802.11b and 802.11g standards cover 2.4GHz



Amateur Radio Opportunities

- A frequency can be selected which falls at least 22MHz below the top of the amateur radio 2.4GHz band. i.e.Channels 1 to 4. Probably 5 is ok
- A network can be set up using an Access Point and one or more clients (computers)
- Access Point functions like a digipeater
- Two clients may communicate directly on a peer-to-peer basis

Amateur Radio peer-to-peer #1

- Requires changing hardware settings for the 802.11b wireless card.
- For this to work you will need a common SSID (use same ham callsign for both stations), a common frequency, and an application
- Freeware applications are available which permit text messaging (see IC3), VoIP (see LAN ic), file sharing.
- Before you change settings, write them down so that you can restore normal operation later.
- Range depends on Tx power out, antenna, and Rx sensitivity

Amateur Radio peer-to-peer #2

- Typical power out is 30mw although much higher power is available. Choose a client card with a pig tail for the antenna connection.
- Typical sensitivity is quite poor – lowest discernible signal is only -85dBm
- Antennas can be dipole-fed dish/grid, looper, LP, helix, coffee can, planer, patch, etc.
- Horizontal polarization is preferred over vertical
- Contacts of 2km to 50km or more are quite realistic.
- The higher the power and the better the antenna, the better your chances.
- Hill-topping is a lot of fun, compact, easy
- Try reflecting off large objects