Portable Cell Initiative

Safety Considerations for Microcells

By: Arpad Kovesdy

**Radiation and Antenna Safety**

1. Electromagnetic radiation emitted by cellular phones and the base station antenna is considered nonionizing radiation: which means that the radiation’s energy is too low to ionize atoms. There are still dangers to using radio equipment, such as thermal effects. These thermal effects can cause injuries because electromagnetic radiation can heat body tissue, especially close to resonant body frequencies, which include 35 MHz, 70 MHz, and 400 MHz for adults, and additional resonances near 700 MHz and 1 GHz.
2. There is some research to suggest a link between biological effects and exposure to radiation. However, there is no demonstrated correlation that “low-level EMR causes adverse health effects”.
3. “The IEEE guidelines excludes any transmitter with an output below 7W because such low-power transmitters would not be able to produce significant whole-body heating”. However, there is concern that certain power densities may be more than standards when considering small transmitters place near the head.

General Guidelines

1. No person should ever be next to a transmitted antenna while it is being powered. Never transmit above 25W in a VHF radio mobile installation without measuring the RF fields emitted in the surrounding area.
2. When using transmitters that transmit above 1 kW of power, ensure that directional antennas are raised 35 feet above inhabited areas.
3. Never work on or touch an RF antenna when power is applied.

**Antenna Grounding**

1. Only certain types of antennas require grounding[[1]](#footnote-1), which include ones that require current flow to the ground to complete a circuit. For example, a quarter-wave vertical is one antenna that requires one wire to connect from the feedline to the base of the antenna and one wire that connects to ground.
2. All other antennas do not require a direct connection to ground. These include dipole antennas or ground plane antennas.
3. “Common-mode currents” must be kept off of the feedline through the use of a “current or choke balun”.

General Guidelines

1. Per the specified recommendations to use a half-wave dipole or similar variant with a ground plane, a current or choke balun must be attached.
2. A direct connection to RF ground is not required if using a half-wave dipole or similar variant with a ground plane.

**Electrical Grounding**

**Generator Safety**

1. Stay at least 24 inches away from power supply, linear generators, transformers, electrical fans, and other sources or drains of AC power when power is applied to avoid exposure to high-level 60 Hz magnetic fields.

**Additional Safe Practices**

Reference: The *1997 ARRL Handbook for Radio Amateurs* © 1996 American Radio Relay League, Inc.(available for reproduction for noncommercial use, provided credit is given)

1. http://www.arrl.org/grounding [↑](#footnote-ref-1)