Small Cell Stations & EMF, Community Meetings, Powerlines

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Overview

• Small Cells: what are they? Likely and future exposure potential.
• Issues surrounding community meetings and how to approach them
What is a Small Cell?
Light Standard

Simulation

Spokane

Simulation
What the Future Holds for Small Cells in Terms of Power Levels

• Typical small cells use 5 to 10 watts of emitted power so with a typical antenna gain the Effective Radiated Power ~500 to 700 Watts

• Heights of current small cells range from 20’ to 45’

• Future power levels – as high as 160 watts

• Heights may be limited to ensuring the public limit is met
Future Power Levels in Comparison to FCC GP Limit

<table>
<thead>
<tr>
<th>Antenna(s) and power level (161 W combined)</th>
<th>Antenna Height (feet above ground)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Commscope V4PP-360QS-F</td>
<td>48.3%</td>
</tr>
<tr>
<td>Commscope VVSSP-360SF</td>
<td>62.0%</td>
</tr>
<tr>
<td>Kathrein 80010843</td>
<td>&gt;limit</td>
</tr>
<tr>
<td>Rosenberger BA-0303T3T3VFX65F-06</td>
<td>&gt;limit</td>
</tr>
</tbody>
</table>
What to do in a Public Meeting?
(Hint: Have great slides)

• Prepare, provide information, documentation
Typical concerns regarding exposures

• In an occupationally exposed environment, workers need to receive training so that they feel comfortable with their exposures and the sources – a personal monitor certainly helps

• For the public:
  • concern about a appropriate safety of the standards
  • Long term/chronic exposures
  • Subjective health effects (headaches, rashes, insomnia, etc)
Typical Radiofrequency Exposures in our Lives

The Public exposure limit is:
- 200 µW/cm² for FM
- 425 µW/cm² for TV (UHF)
- 570 µW/cm² for cellular
- 1,000 µW/cm² for PCS
Common Radiofrequency Emissions (µW/cm²)

(µW/cm²) = microwatts per centimeter squared

- 1 cm²
- 1 in²

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Typical Emissions</th>
<th>Maximum Emissions</th>
<th>Permissible Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Monitor (9 FEET)</td>
<td>0.3</td>
<td>1.0</td>
<td>0.025%</td>
</tr>
<tr>
<td>Bluetooth Headset</td>
<td>0.00823%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM &amp; TV</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless Laptop</td>
<td>0.08%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WiFi</td>
<td>0.02%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cordless Phone</td>
<td>0.00823%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile Phone</td>
<td>0.779%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macro Sites (Outdoors)</td>
<td>0.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macro Sites (Indoors)</td>
<td>0.005%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Cells (Outdoors)</td>
<td>0.09%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of legally permissible emissions for each device is less than one percent when used typically.

Source: Andrew H. Thatcher, Board Certified Health Physicist (c) 2018
To put the exposure into perspective, if the top of Mt. Rainier is the allowed public limit, the maximum outdoor exposure is 46’ high.
Cancer Stat Facts: Brain and Other Nervous System Cancer

Statistics at a Glance

At a Glance

- Estimated New Cases in 2017: 23,800
- % of All New Cancer Cases: 1.4%
- Estimated Deaths in 2017: 16,700
- % of All Cancer Deaths: 2.8%

Percent Surviving 5 Years: 33.6%

2007-2013

Graph showing New Cases and Deaths from 1992 to 2014.
What Are MAGNETIC FIELDS?

Magnetic Fields are created when electrical current is flowing.

What are they NOT?
- Ultraviolet
- X-Rays
- Gamma Rays

WHERE are they?
- Anywhere electricity is used.
How do they COMPARE?

550 mG, static field

3 mG

10 mG

10 mG

300 mG

230 kV Power Line:
at 50 feet the magnetic field is ~20 mG
at 100 feet the magnetic field is ~7 mG

Exposure at 1 ft distance

mG = milliGauss

How do exposures compare to international guidelines?

2,000 mG
recommended limit

20 mG

300 mG

power lines

washing machine

10 mG

coffee maker

No
Washington State or federal exposure standards exist.

CONTINUING EDUCATION PROGRAMS
NORTHWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY
DEPARTMENT OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH SCIENCES
University of Washington School of Public Health
Reverse phasing of the conductors on a double circuit can result in a ~70% reduction in the magnetic field.