

## Radio Frequency (RF) & Smart Meters

### Questions & Answers

#### 1. What kind of device is a Smart Meter

A smart meter is an electronic device that consists of hardware and software. Smart meters typically measure the amount of electricity used and the timing of electricity used by consumers or businesses, and transmit that information digitally to utility companies and authorized third parties. Similarly, smart meters are also used to measure water and natural gas consumption. Many smart meters in the US use radio transmission for communications, while other smart meters, particularly for electricity, communicate over electric power lines. Smart meters that use RF to communicate do so similarly to how cordless and cellular telephones and wireless-enabled laptop computers communicate.

#### 2. What types of devices create Radio Frequency (RF) emissions?

Many commonly used devices create RF emissions. RF emissions are emitted daily when individuals use microwave ovens, wireless baby monitors, home (or neighbor) Wi-Fi computer networks, cordless or cellular telephones, garage door openers, and many other items dependent on radio spectrum.

#### 3. Do Smart Meters create more RF emission than Cell Phones and Laptops?

No. The California Council on Science and Technology (CCST), a non-profit organization sponsored by the California state government, says that, "RF from smart meters are similar to those from many other devices that we use in our daily lives, including cordless and cellular telephone, microwave ovens, wireless routers, hair dryers, and wireless-enabled laptop computers."<sup>i</sup> Smart meters emit less RF than other typical household appliances. According to the CCST, "wireless smart meters, when installed and properly maintained, result in much smaller levels of radio frequency (RF) exposure than many existing common household electronic devices, particularly cell phones and microwave ovens."<sup>ii</sup> The California Public Utilities Commission concurs. It concludes that the level of "RF emissions produced by Smart Meters is extremely small in comparison to the RF emissions from many other commonly used devices and far below emission standards set by the FCC, which licenses or certifies the Smart Meters."<sup>iii</sup>

The following comparison chart, developed by the Utilities Telcom Council, provides comparative data on the emissions of commonly used devices that emit RF, or environments where RF energy is prevalent to the emissions of Smart Meters.

**Device Relative Power Density in microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ):<sup>iv</sup>**

FM radio or TV broadcast station signal	0.005
SmartMeter™ device at 10 feet	0.1
Cyber cafe (Wi-Fi)	10-20
Laptop computer	10-20
Cell phone held up to head	30-10,000
Walkie-Talkie at head	500-42,000
Microwave oven, two inches from door	5,000

Source: Richard Tell Associates, Inc.<sup>v</sup>

**4. Are the RF Emissions from Smart Meters Dangerous?**

There is no known hazard to human health caused by RF emissions from technologies such as smart meters when used according to safety guidelines... The CCST says that “the FCC guideline provides a more than adequate margin of safety against the known thermal effects” of RF emissions.<sup>v</sup> The CCST also states that other effects unrelated to temperature impacts, referred to as non-thermal effects, have not been scientifically established to occur, which is a view in line with most other scientific expert bodies. They conclude that there is no indication of health risks from exposures to RF emissions from smart meters via any possible non-thermal mechanism.<sup>vi</sup> Furthermore, the California Public Utilities Commission finds that RF emissions from deployed smart meters are “one/six thousandth of the Federal health standard for this type of exposure at a distance of 10 feet.”<sup>vii</sup> The Maine Center for Disease Control & Prevention (MCDPC) similarly concludes that existing studies “do not indicate any consistent or convincing evidence to support a concern for [adverse] health effects related to the use of radiofrequency in the range of frequencies and power used by smart meters.”<sup>viii</sup>

**5. Does the Government have Guidelines on RF exposure?**

Yes. In the US, the Federal Communications Commission (FCC) has oversight responsibility for RF emissions and exposure, and it has adopted exposure limits that ensure protection of the public and workers. The actual RF emissions from smart meters, however, are a fraction of the limit allowed by the FCC. Also, the CCST says that smart meters under normal circumstances would yield RF emissions that are “3% of the FCC exposure guidelines.”<sup>ix</sup> Although smart meters typically transmit for a very small portion of the day (generally less than one minute per day), the CCST concluded that even if a smart meter transmitted 24 hours a day, “the maximum exposure would be about 60% of the FCC limit, which provides a wide safety margin from known thermal effects of RF emissions.”<sup>x</sup>

Most countries around the globe have restrictions on RF emissions. The World Health Organization (WHO), monitors research on RF on a global basis and maintains a comprehensive website with an extensive database of the RF research.<sup>xi</sup>

#### 4. Are Smart Meters like Cell Phone Towers?

No. Smart Meters should not be compared to Cell Phone towers. Even though they both transmit information via radio signals, smart meters use far less power and their radio signals don't travel as far as cell phone towers. The MCDP agrees. It says RF emissions from smart meters are not similar to those from cell phone towers. Instead, they are similar to the emissions from typical in-home wireless routers. Furthermore, "smart meters are used at the most about 10% of the time" throughout the day, while both cell phone towers and wireless routers are used much more frequently.<sup>xii</sup>

#### 5. What about EMF and Electromagnetic Sensitivity?

Based on its examination of existing research, the MCDP concludes that there is no known "association of EMF exposure and symptoms that have been described as electromagnetic sensitivity."<sup>xiii</sup> At the same time, the CCST says EMF exposure from smart meters is "very low" in comparison to other common devices.<sup>xiv</sup> The WHO explains that "EHS [Electromagnetic hypersensitivity] has no clear diagnostic criteria and there is no scientific basis to link EHS symptoms to EMF exposure."<sup>xv</sup> "The majority of studies indicated that people who described themselves as suffering from such sensitivity could not detect whether they were being exposed to an electromagnetic field in experiments any more accurately than non-E.H.S. individuals," said the Maine review, issued in November.

#### 8. Has anyone ever been injured by RF from a Smart Meter?

U.S. utilities began installing meters equipped with radios for remote meter reading in the mid-1980's. Over 50 million such devices are now in operation around the US, including many millions inside customer homes (on water meters or gas meters). There has never been a documented injury or health problem associated with such meters. Today's smart meters use radios similar to those used in early applications.

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- i "Health Impacts of Radio Frequency from Smart Meters," California Council on Science and Technology, January 2011, <http://www.ccst.us/publications/2011/2011smartA.pdf>
- ii "Health Impacts of Radio Frequency from Smart Meters," California Council on Science and Technology, January 2011, <http://www.ccst.us/publications/2011/2011smartA.pdf>
- iii "Decision Granting Motion of Pacific Gas and Electric Company to Dismiss Application," Public Utilities Commission of the State of California," December 2010, [http://docs.cpuc.ca.gov/word\\_pdf/FINAL\\_DECISION/127604.pdf](http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/127604.pdf)
- iv Pacific Gas and Electric: <http://www.pge.com/myhome/edusafety/systemworks/rf/>
- v "Health Impacts of Radio Frequency from Smart Meters," California Council on Science and Technology, January 2011, <http://www.ccst.us/publications/2011/2011smartA.pdf>
- vi "Health Impacts of Radio Frequency from Smart Meters," California Council on Science and Technology, January 2011, <http://www.ccst.us/publications/2011/2011smartA.pdf>
- vii "Decision Granting Motion of Pacific Gas and Electric Company to Dismiss Application," Public Utilities Commission of the State of California," December 2010, [http://docs.cpuc.ca.gov/word\\_pdf/FINAL\\_DECISION/127604.pdf](http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/127604.pdf)
- viii "Maine CDC Executive Summary of Review of Health Issues Related to Smart Meters," Maine Center for Disease Control & Prevention, November 2008, [http://www.maine.gov/dhhs/boh/documents/Smart\\_Meters\\_Maine\\_CDC\\_Executive\\_Summary\\_11\\_08\\_10.pdf](http://www.maine.gov/dhhs/boh/documents/Smart_Meters_Maine_CDC_Executive_Summary_11_08_10.pdf)
- ix "Health Impacts of Radio Frequency from Smart Meters," California Council on Science and Technology, January 2011, <http://www.ccst.us/publications/2011/2011smartA.pdf>
- x "Health Impacts of Radio Frequency from Smart Meters," California Council on Science and Technology, January 2011, <http://www.ccst.us/publications/2011/2011smartA.pdf>
- xi World Health Organization International EMF project: <http://www.who.int/peh-emf/en/>
- xii "Maine CDC Executive Summary of Review of Health Issues Related to Smart Meters," Maine Center for Disease Control & Prevention, November 2008, [http://www.maine.gov/dhhs/boh/documents/Smart\\_Meters\\_Maine\\_CDC\\_Executive\\_Summary\\_11\\_08\\_10.pdf](http://www.maine.gov/dhhs/boh/documents/Smart_Meters_Maine_CDC_Executive_Summary_11_08_10.pdf)
- xiii "Maine CDC Executive Summary of Review of Health Issues Related to Smart Meters," Maine Center for Disease Control & Prevention, November 2008, [http://www.maine.gov/dhhs/boh/documents/Smart\\_Meters\\_Maine\\_CDC\\_Executive\\_Summary\\_11\\_08\\_10.pdf](http://www.maine.gov/dhhs/boh/documents/Smart_Meters_Maine_CDC_Executive_Summary_11_08_10.pdf)
- xiv "Health Impacts of Radio Frequency from Smart Meters," California Council on Science and Technology, January 2011, <http://www.ccst.us/publications/2011/2011smartA.pdf>
- xv Electromagnetic hypersensitivity - Fact Sheet N°296 (December 2005) <http://www.who.int/mediacentre/factsheets/fs296/en/index.html>