

### Q. WHAT IS RADIO FREQUENCY (RF) ENERGY?

A. RF emission describes the energy associated with electromagnetic waves. We are surrounded by everyday conveniences that produce radio frequency emissions such as cordless phones, cell phones, microwave ovens and baby monitors.

### Q. DO SMART METERS EMIT DANGEROUS LEVELS OF RF?

A. Smart meters do not emit dangerous levels of RF. In fact, RF emissions from a typical smart meter fall far below federal limits. The RF exposure a person might encounter from a smart meter in a typical household setting can be of significantly less strength than the RF signals they are exposed to from common, electronic devices found within the home, such as cell phones, microwave ovens, Wi-Fi networks and radio and television broadcasts.

Source: Electric Power Research Institute (EPRI), Radio Frequency Exposure Levels from Smart Meters, November 2010.

### Q. WHAT DETERMINES A PERSON'S EXPOSURE TO RF?

A. Exposure levels depend on signal strength, transmission duration and distance. A report published by the California Council of Science and Technology (CCST) in 2011 included findings from the Electric Power Research Institute (EPRI) that the estimated maximum exposure level at one foot from a smart meter is far below the FCC guidelines; at a distance of about 10 feet, the power-density exposure lessens significantly.

Source: California Council of Science and Technology, "Health Impacts of Radio Frequency from Smart Meters," January 2011.

The exposure a person receives from a smart meter's RF signal is determined by the person's distance from the meter, the length of time the meter transmits and the power level of the meter.

RF SOURCE	RF OUTPUT COMPARED TO STANDING TWO FEET FROM AN UNOBSTRUCTED SMART METER*
Standing in front of an active microwave oven, two inches from door	550x more
Holding a live walkie-talkie to your head	Up to 4,600x more
Holding an active cell phone to your ear	Up to 1,100x more
Using a laptop computer	1.1 to 2.2x more
Sitting in a WiFi café	1.1 to 2.2x more

\* Source: Silver Springs Networks, "Radio Frequency Networks Whitepaper: An Analysis of Radio Frequency Exposure Associated with Silver Spring Networks' Advanced Metering Devices," Rev. 11/1/11, page 2.

### Q. WHAT ARE THE HEALTH IMPACTS OF RF AND SMART METERS?

A. Scientific panels and government authorities throughout the world have conducted numerous studies about the effects of RF on human health and found no evidence to suggest that RF emissions from smart meters pose any specific health risk.

### Q. ARE THERE GOVERNMENT HEALTH-BASED STANDARDS FOR EXPOSURE TO RF EMISSIONS?

A. Yes. The National Environmental Policy Act of 1969, among other rulings, requires the Federal Communications Commission (FCC) to evaluate the effect of emissions from FCC-regulated transmitters on the quality of the human environment. In 1996, the FCC adopted the National Council on Radiation Protection and Measurements' recommended "maximum permissible exposures limits" for field strength and power density for transmitters operating at frequencies of 300 kHz to 100 GHz – where smart meters operate.

### Q. DO SMART METERS USE RADIO FREQUENCIES REGULATED BY THE FCC?

A. Yes. These frequencies are called industrial, scientific and medical (ISM) radio bands. The FCC designates the ISM frequency bands for equipment and appliances that generate and use RF energy. The FCC opened these frequency ranges for wireless communications in 1985 and, since then, experienced a steadily increasing stream of devices occupying the bands. Their exact ranges are as follows:

	FREQUENCY RANGE (MHZ)	CENTER FREQUENCY (MHZ)
ISM900	902-928 MHz	915 MHz
ISM2400	2400-2500 MHz	2450 MHz

More 

# Radio Frequency

## Q. DO SMART METERS INTERFERE WITH MEDICAL DEVICES LIKE PACEMAKERS?

A. No. The Food and Drug Administration requires pacemaker manufacturers to test their devices for susceptibility to electromagnetic interference over a wide range of frequencies. Electromagnetic shielding is incorporated into the design of modern pacemakers to prevent RF signals from interfering with the electronic circuitry in the pacemaker. However, RF emitted from smart meters may interact with some electronic devices. This is called electromagnetic interference.

## Q. DO SMART METERS PRODUCE THE SAME KIND OF RADIATION AS X-RAYS?

A. No. X-rays and gamma rays are types of ionizing radiation. Ionization is a process by which electrons are stripped from atoms and molecules. This process, which is associated with X-rays but not with RF transmissions, can produce molecular changes that can lead to damage in biological tissue, including effects on DNA, the genetic material of living organisms. The process requires interaction with high levels of electromagnetic energy. The energy levels associated with RF are not great enough to cause the ionization of atoms and molecules.

## Q. DO SMART METERS TRANSMIT MICROWAVE ENERGY?

A. No. Smart meters do not use microwave frequencies to communicate with the network. They use a low-power 900 MHz radio to communicate to ComEd's computers. While a typical smart meter also has a 2.4 GHz radio, it is not used for network communications. This radio is designed to communicate meter usage data with in-home devices that a customer may choose to purchase. Additionally, the radios in smart meters are low power (1 Watt or less) and, unlike many other devices that transmit RF, operate intermittently and do not continuously transmit.

## Q. ISN'T RF FROM SMART METERS A TYPE OF CARCINOGEN?

A. In spring of 2011, the International Agency for Research on Cancer (IARC) released the results of its expert panel's evaluation on potential radio frequency exposures for cell phones. A June 2011 update stated, "A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use."

The update also stated, "To date, research does not suggest any consistent evidence of adverse health effects from exposure to radiofrequency fields at levels below those that cause tissue heating. Further, research has not been able to provide support for a causal relationship between exposure to electromagnetic fields and self-reported symptoms, or 'electromagnetic hypersensitivity.'" However, based on limited epidemiologic evidence in studies of cell phones and limited evidence from a small fraction of all reported animal experiments, the IARC classified electromagnetic fields as a "possible" or a group 2B carcinogen. Group 2B is a category used when a causal association is considered credible but when chance, bias or confounding cannot be ruled out with reasonable confidence. (Other Class 2B carcinogens include coffee and pickled vegetables.) This classification means more research information would be required for a more definitive statement in either direction.

Source: World Health Organization, "Electromagnetic Fields and Public Health: Mobile Phones," Fact Sheet No. 193, June 2011.

## IARC CARCINOGEN GROUPS

GROUP 1	Carcinogenic to humans
GROUP 2A	Probably carcinogenic to humans
GROUP 2B	Possibly carcinogenic to humans
GROUP 3	Not classifiable as to its carcinogenicity to humans
GROUP 4	Probably not carcinogenic to humans

Source: <http://monographs.iarc.fr/ENG/Classification/index.php>

## Q. WHO TESTS FOR THE SAFETY OF SMART METERS BEFORE INSTALLATION?

A. Manufacturers test their smart meters prior to installation to ensure they meet all FCC standards for safe levels of all emissions.

For more information, visit [ComEd.com/SmartGrid](http://ComEd.com/SmartGrid)