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## Learn the Risks: Electromagnetic Frequencies

By Tirza at *Better Breast Health – for Life!*<sup>TM</sup>

Electromagnetic frequencies (EMF) are produced by electrically charged objects, including everything from toasters to cell phones and satellites. Any source of EMF in proximity to another will produce overlap, or layering, and an additive effect.

Over exposure to EMF has been linked to diseases such as ALS (Lou Gehrig's disease), Alzheimer's, cancer, childhood leukemia, Chronic Fatigue Syndrome, fibromyalgia, heart problems, miscarriages, and MS. EMF contributes to many chronic sleep disorders and has also been linked to the alarming increase of cancers, asthma, autism, ADD/ADHD and physiological and behavioral problems in children.

For adults, the adverse effects of exposure appear to arise slowly over a long period of time. For example, it may take 5 to 10 years in the case of leukemia or perhaps 30 to 40 years in the case of Alzheimer's.<sup>1</sup> It appears that people develop different conditions due to their own unique immune strengths and stressors: their "weakest link."<sup>2</sup>

Let's learn more about this risk factor.

### What Is EMF?

Electromagnetic fields, whether natural or man-made, are invisible electrical and magnetic waves constituting radiation. They are referred to as electromagnetic frequencies (EMF) or radiation (EMR).

**EMF is radiation.** All electricity creates radiation.

According to [Safe Space](#):

**Electrical fields** are created by electric charges, or voltage (the force of electricity)

- Always there when an appliance is plugged in (even if the appliance is turned off)
- ***Can be shielded or blocked by metal housing and other barriers.***

- Measured in units of hertz (cycles per second)

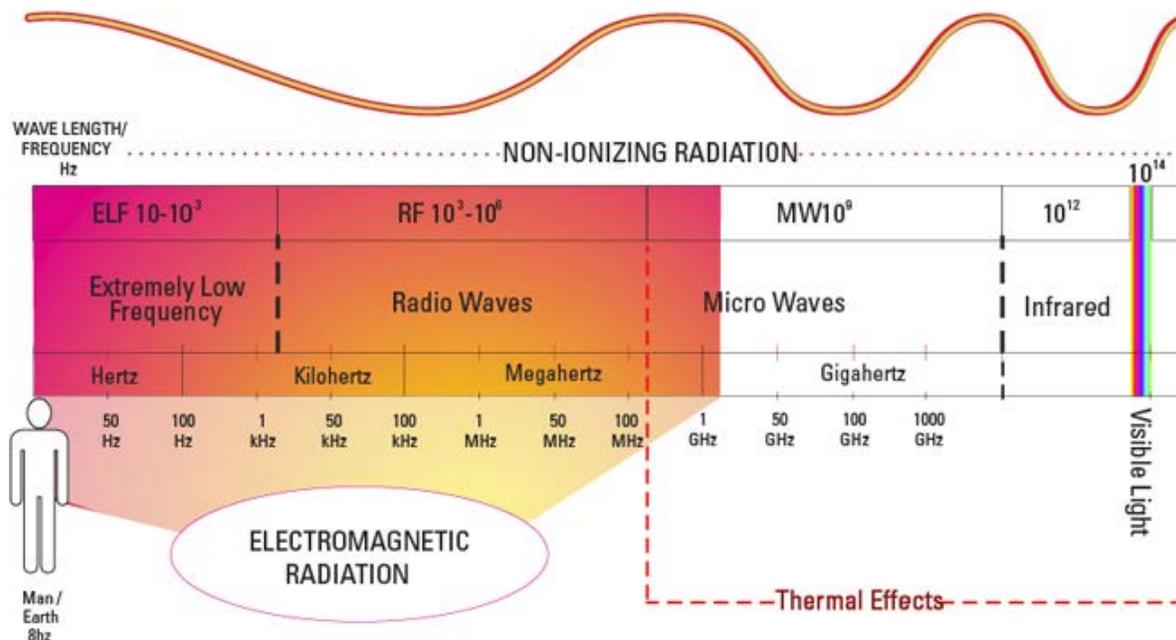
**Magnetic fields** are created by moving electric charges (electric current)

- Only there when the appliance is operating (when current is flowing)
- **Hard to shield: can penetrate steel, concrete and human bodies (human bodies have the same permeability as air when it comes to magnetic fields)**
- The more powerful the current, the more powerful the magnetic field
- Measured in units of gauss (G) or milliGauss (mG).

**Natural EMF** is extremely low frequency (ELF), low in intensity, and produced by the earth, some stones and crystals, the living cells of plants and animals, and more. We are bio-electric beings that resonate with the earth's magnetic frequency at around 10 hertz. While every cell in our bodies resonate with EMF, maintaining relatively stable, healthy frequencies is crucial to healthy bodily functions.

**Artificial EMF** is created by mankind's technologies, from televisions to appliances, computers, phones, cell towers, power supplies, high voltage power lines, etc. They can create high frequency and high intensity EMF that disrupts the body's natural cellular energy fields.

The strength of an EMF, and its resulting radiation, depends on its wavelength (meters) and frequency (Hertz). A greater number of waves with shorter wavelengths create more energy as you move up the spectrum:



Source: [Safe Space](#)

### **Extremely Low Frequency (ELF)**

- On the low end of the electromagnetic spectrum
- Longer wavelengths
- ***Come from the 50 - 60 hertz power lines that feed our homes and appliances***
- Dangerous to health, especially when near the body for long periods of time.

### **Radio Frequency Radiation (RF)**

- On the high end of the electromagnetic spectrum
- ***Come from wireless technologies including cell phones, cordless phones, mobile devices, broadcast towers, Smart Meters, electrical security systems, sonar and more***
- The higher the frequency or wavelength, the more dangerous to health

### **Microwave Radiation**

- Microwaves, with their very short wavelengths are an example of very high radio frequency radiation (RF)
- Microwave radiation has especially been shown to be dangerous to living organisms
- ***Many cell phone towers operate in the microwave range, and cell phones and Smart Meters transmit in the radio-frequency microwave range***

## **Sources of EMF Radiation**

We are exposed to EMF radiation at sleep, at work, at home, at play: at any location where electrical power is generated, distributed, available or in use (includes television, radio, satellite, cellular, and wireless signals). Metropolitan homes and offices are saturated with propagating EMF radiation from various sources.

Sources of EMF radiation **in our homes** include:

- Wireless devices like cordless and cell phones, wi-fi routers, laptops, printers, PDAs and tablets, home security systems, baby monitors, garage door openers and Smart Meters
- Electrical wiring and appliances like computers, (plasma) televisions, stereo systems, air conditioners, DVRs, refrigerators, blenders and food processors, portable heaters, clothes washers and dryers, coffee makers, vacuum cleaners, power tools, toasters, electric ranges, and microwave ovens

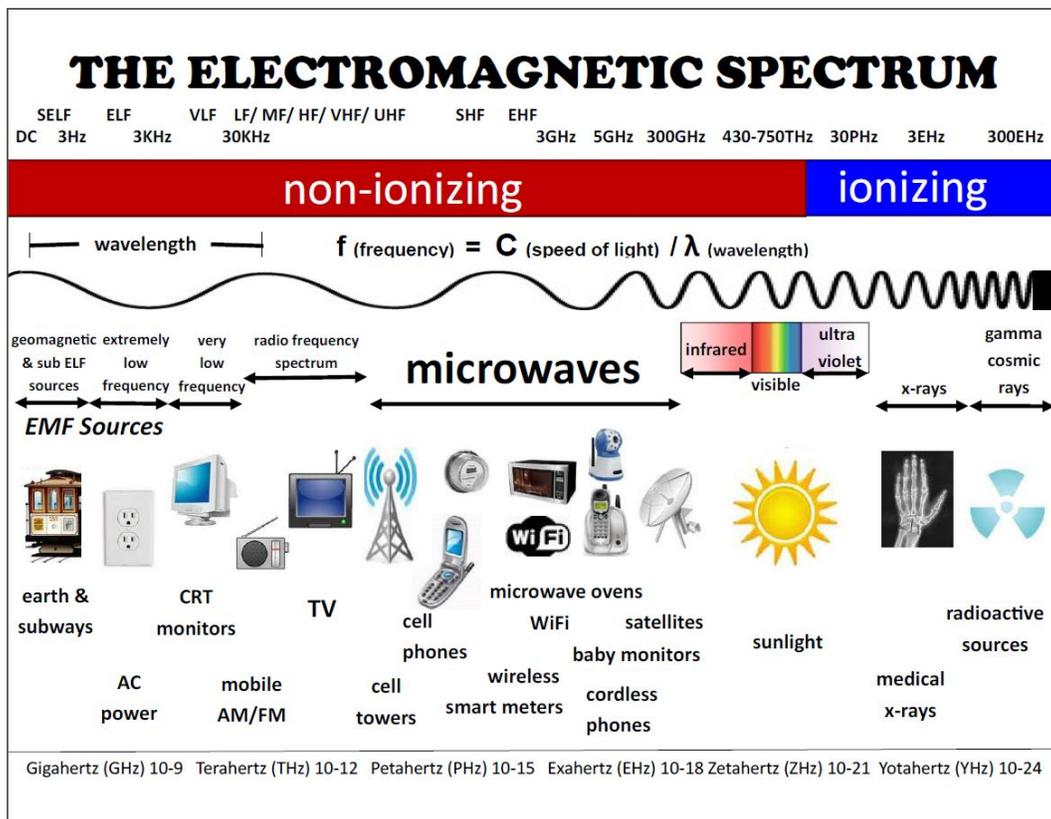
- Miscellaneous items like electric blankets, electric water bed heaters, hairdryers, curling irons, electric shavers, power cords and supplies, halogen and fluorescent lights, and dimmer switches

In addition, traveling to our **workplaces and favorite businesses** expose us to power lines and towers, television and satellite transmissions, as well as radio and microwave communication systems, including cell towers and Smart Meter mesh networks. Transportation methods such as automobiles, buses, trucks, airplanes, electrical and magnetic trains and subway systems are significant sources of EMF radiation. And many businesses have more extensive networks of computers, phones, lighting, printers, wi-fi, and heavy-duty and commercial equipment using large amounts of electricity.

## When Electromagnetic Fields Are Unsafe

The human body resonates with the earth’s magnetic frequency at around 10 Hz (Hertz) – at extremely low frequency (ELF). **Frequencies above that can adversely affect us.** Power lines to our homes and many electrical appliances resonate at around 50 or 60 Hz. Cell phones, Smart Meters, some televisions, and many wireless devices operate at significantly higher frequencies and above 3 GHz (gigahertz), while cell towers can operate up to 300 GHz.

The frequencies of most concern are those that are very strong, near the body, or of high frequency – including all microwave frequencies:



Source: [The Cell Towers](#)

[Click here](#) for a table of technologies listed by frequency range.

While the globally accepted safety limit for exposure to **ELF** magnetic fields is **2.5 mG** (milliGauss), the lowest level linked to childhood cancer is 2.0 mG.<sup>3</sup> Cautious or sensitive individuals may try to reduce magnetic field exposure to 0.5 mG or less.

And while **RF/microwaves** vary greatly from one home to another, depending on the use of cell phones, cordless phones, wireless devices and Wi-Fi, average home levels typically vary from 0.01 to 0.5  $\mu\text{W}/\text{cm}^2$  (microwatts per centimeter squared).<sup>4</sup> The Bioinitiative Report, explained below, recommends a precautionary limit of **0.1  $\mu\text{W}/\text{cm}^2$** , and 1/100<sup>th</sup> that, or 0.001  $\mu\text{W}/\text{cm}^2$  or less for sensitive individuals.

Over exposure of EMF radiation can put individuals at risk for developing health problems ranging from headaches to sleep disorders, fatigue, dizziness, skin rashes, miscarriage, leukemia, and other cancers.<sup>5</sup>

Let's consider intensity, duration, distance, and layering with **wi-fi** routers, as an example:

- **Intensity:** Wi-fi and DSL routers and cable modems emit low gigahertz EMF, considered by scientists and health experts as potentially dangerous.
- **Duration:** Most routers and modems don't get turned off at night: they stay on... emitting EMF 24/7.
- **Distance:** While wi-fi EMF is typically measured within feet of a router, signals extend for many feet, as evidenced by the following example.
- **Layering:** What happens when you check for a network signal? You likely see the wi-fi signals of your neighbors. EMR sources overlap and are all around you.

Of particular concern are **Smart Meters**. They replace analog meters and the need for a representative to "read the utility meter." With two antennae, they operate in the 902-928 MHz range and in the radio-frequency microwave range (300 MHz to 3 GHz). Their combined peak output is around 650  $\mu\text{W}/\text{cm}^2$ .<sup>6</sup> (The safe limit is 0.1  $\mu\text{W}/\text{cm}^2$ .)

At least 90% of the 9,600 to 190,000 daily pulses emitted by Smart Meters are not your utility usage data transmissions, but "mesh network" communications known as "chatter." Learn more about [Smart Meters](#).

## Health Consequences

Many processes of the human body are regulated with bioelectrical signals. EMFs interfere with their healthy regulation. Tens of thousands of studies show that chronic exposure to EMF radiation can disrupt sleep cycles, weaken immunities, increase stress levels, affect DNA and lead to devastating illnesses like cancer.

According to [safespace](#):

**“Artificial EMFs change the frequency of your body's electromagnetic fields through a process called entrainment** (or sympathetic resonance). Entrainment is the tendency of an object to vibrate at the same frequency as something outside of it. In other words, powerful artificial EMFs overwhelm your body's own electrical fields, changing their frequency and distorting the balance of the body's electromagnetic field and its communication systems. This causes physical, mental and emotional chaos.

The danger doesn't always pass once you get away from the strong electromagnetic field. **That's because biological systems have been proven to store electromagnetic radiation within the cells** in the form of *electromagnetic oscillations*. These oscillations can stubbornly remain inside you, wreaking havoc with your body's most important processes.

**Compounding this problem, metallic objects all around us act as antennae.** These include electrical circuits, telephone wiring, water and gas pipes, even your keys and jewelry, which collect and re-radiate these disorienting energy waves.

**The highest frequency energy waves (X-rays, gamma rays and others) can break chemical and molecular bonds,** and can literally rip atoms apart, disrupting the basic biochemical structures of life.”

We're exposed to 100 million times greater EMF radiation than our grandparents were, and that exposure grows each year.<sup>7</sup> EMF radiation surrounds us... and is inside us... 24/7.

"Electromagnetic pollution may be the most significant form of pollution human activity has produced in this century, all the more dangerous because it is invisible and insensible." *Dr. Andrew Weil, M.D.*

Tens of thousands of studies worldwide have shown that chronic exposure to EMF radiation can lead to weakened immunities and devastating illnesses like cancer.

From [EMF Wise](#), “The [Bioinitiative 2012 report](#), released in December 2012, is a 5-year update since the Bioinitiative 2007 report on the situation of electromagnetic fields and health. The report was prepared by 29 authors from ten countries, ten holding medical degrees (MDs), 21

PhDs, and three MsC, MA or MPHs, 3 former presidents of the Bioelectromagnetics Society, Senior Advisor to the European Environmental Agency, and Chair of the Russian National Committee on Non-Ionizing Radiation. In light of newer evidence, the recommended [exposure standards](#) were further lowered.

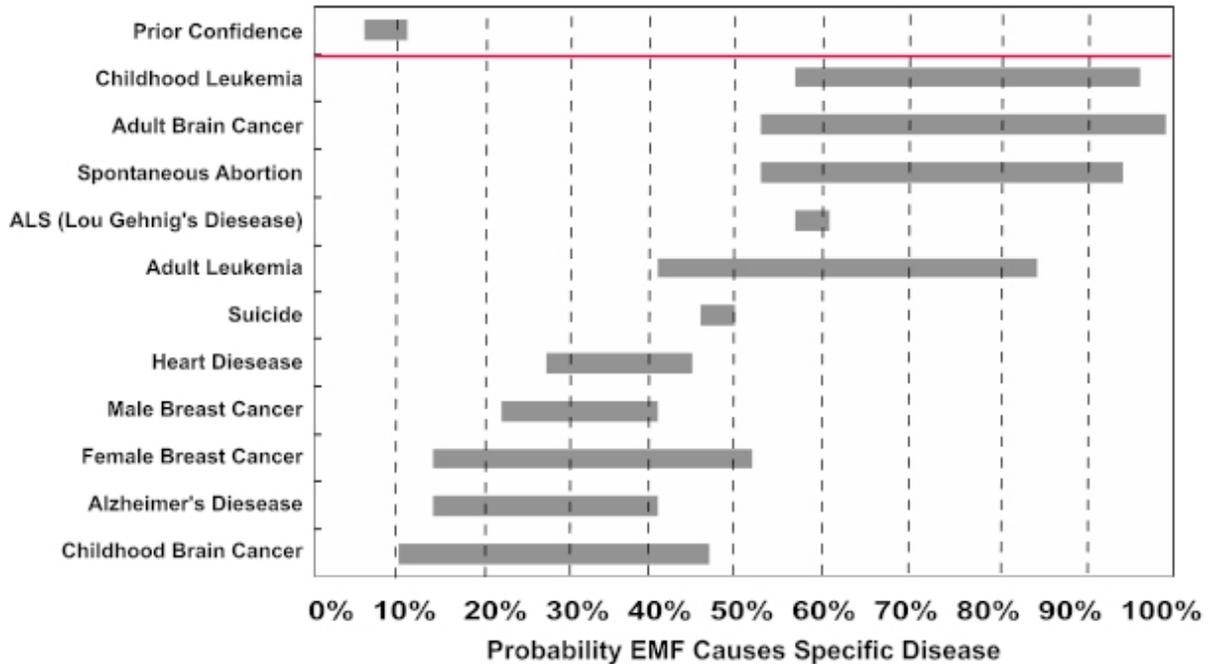
The report includes studies suggesting evidence that EMF:

- Affects gene and protein expression
- Has genotoxic effects – RFR and ELF DNA damage
- Induces stress response
- Affects immune function
- Affects Neurology and behavior
- Causes childhood cancers (Leukemia) and adult cancers (Leukemia and Brain)
- Impacts melatonin production; Alzheimer’s Disease; Breast Cancer
- Promotes breast cancer (Melatonin links)”

The [California Department of Health Services \(CDHS\) 2002 EMF Report](#) summarizes potential links between **magnetic fields** and thirteen health conditions, reporting that:

- “Magnetic fields likely cause childhood and adult leukemia, adult brain cancer, spontaneous abortions, and ALS.
- They possibly cause childhood brain cancer, female and male breast cancer, Alzheimer’s disease, suicide, and heart problems.
- They are unlikely to universally impact all types of cancer or reproductive failures other than spontaneous abortions
- There is insufficient information to determine if magnetic fields cause clinical depression.
- Animal studies show that magnetic fields at low intensities have profound effects on selective biological organisms.
- The report finds that, with respect to the diseases possibly or likely caused by EMF “even a slight additional lifetime risk could be of concern to regulators”.

The following graph shows the range of the estimates of probabilities that EMF causes specific diseases. “Prior confidence” is the researchers’ estimate of the overall disease probability assigned before learning about the recent research results.”<sup>8</sup>



Source: [BizNetMall](#)

Symptoms of **Electrical Hypersensitivity (EHS)** may include skin rash, sleep disorders, muscle and joint pain (fibromyalgia), chronic fatigue, depression, headaches, dizziness, nausea, difficulty concentrating, memory loss, irritability, anxiety, weakness, muscle spasms, numbness, tingling, leg and foot pain, "flu-like" symptoms and fever.<sup>9</sup>

## EMF Radiation – Melatonin – Hormone-Sensitive (Breast) Cancers

Our body depends on the pineal gland to properly secrete the hormone melatonin while we sleep. Melatonin scavenges free radicals in all cells and hence is a potent antioxidant with anti-aging and anti-cancer properties.<sup>10</sup> EMF radiation has been found to significantly reduce melatonin.

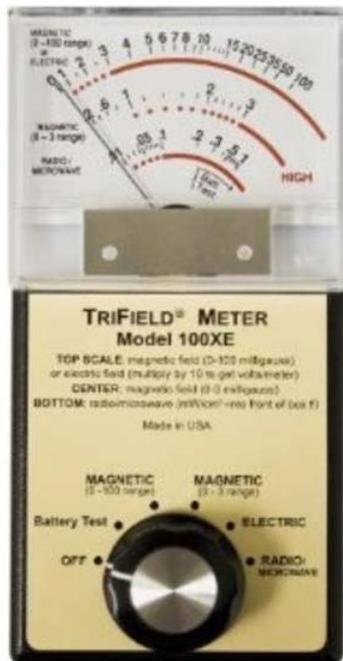
Because melatonin suppresses estrogen production, inadequate melatonin increases the turnover of breast cells, increasing the likelihood of malignant transformation, particularly in the presence of cancer-promoting agents, i.e. common environmental chemicals.<sup>11</sup> So while melatonin plays a role in hormone-sensitive cancers, it is an important natural suppressor of [breast cancer](#) cell growth.

Did you know that malignant breast tissue can absorb up to 577% more EMF radiation than healthy breast tissue, and that women undergoing breast cancer treatment should avoid wearing underwires in their bras? [Learn more.](#)

## Measuring Your EMF Exposure

Keep in mind that EMF radiation is invisible, typically unperceivable, and travels through doors, floors, ceilings, rooftops, walls and human bodies (like air). And that metal in or on the body attracts it. While EMFs vary by location, time of day, status of source (active or inactive), overlapping signals and waves, etc, direct measurements can be obtained with an appropriate meter.

My favorite is the Tri-Field Meter Model 100XE purchased through Amazon.com because it is reliable and modestly priced (around \$100). I use it to check the electric, magnetic and radio/microwave frequencies emitted from things like the dashboard of my car, cell phone, kitchen appliances, power panels at home and work, and where I eat, sleep, play, etc. It helps me to determine “safe distances” from EMF sources and how effectively my EMF mitigation techniques are working.



### Here Are Safe Levels of EMF via the Tri-Field Meter:

**1 kV/m or less on the upper scale: magnetic or electric**  
- for: power lines, electric wiring, home appliances, etc

**1 mG or less on the middle scale: magnetic**  
- for: television, active cell or cordless phone, etc

**0.1  $\mu\text{W}/\text{cm}^2$  or less on the bottom scale: radio / microwave**  
- for: active wireless devices, including phones, computers, printers, routers, modems, and baby monitors; Smart Meters, microwave ovens, etc

### **Common Locations to Measure:**

(In each location, check for EMF sources. How far away do you need to be to measure safe levels?)

- Home or work office – where you sit or work
- Where you sleep – especially where your head rests
- Where you relax, i.e. living room – near your couch or recliner
- Where you prepare foods – and the frig, dishwasher, toaster, microwave, blender, stovetop or range, etc.
- Where you eat – in, out or at work
- Where your children spend time – at home, school and play
- Where your pets spend time - are they lying at your feet under your home office desk where power, computer and phone lines run? Are they outside or in dog runs near a Smart Meter?
- Where is your Smart Meter? Near your bed, kitchen sink, home office?
- Does your residence or workplace have cell towers, power lines, high tension wires, or Smart Meters nearby?
- What are your modes of transportation - automobile, bus, train, subway, airplane, etc? (My 2012 vehicle emits unsafe levels of EMF radiation into my body (above 3 mG) from the computerized dash – every second the car is powered on and I am in the driver's seat. And some newer cars come wi-fi enabled. Oh my.)
- Businesses you frequent to eat, relax, play, entertain, shop, etc.

### **Protecting Yourself And Your Loved Ones**

In the future, I'll be publishing articles on: Protecting Yourself from EMF. These articles will include simple tips on managing a variety of EMF-producing gadgets and technologies. See them at [Preventive Support](#). Strategies include:

#### **Reduce Your Exposure**

- Identify the Sources
- Management Tips & Tricks
- Healthy Alternatives

**Mitigate Your Exposure** (Keep in mind that electric fields can be shielded or blocked by metal housings and other barriers, while magnetic fields are hard to shield and can penetrate steel, concrete and human bodies, which have the same permeability as air when it comes to magnetic fields. The greater the electric current, the greater the magnetic field.)

- Shield
- Harmonize
- Sympathetic Resonance Technology

- Ground
- Dress and Accessorize
- Detox
- Nourish

**And More!**

## Learn More:

If you're interested in learning more about EMF, check out the below websites or studies:

[safespace.com](http://safespace.com)

[emfwise.com](http://emfwise.com)

[emfcenter.com](http://emfcenter.com)

[dirtyelectricity.com](http://dirtyelectricity.com)

[Public Health Implications of Wireless Technologies](#)

[EMF Reduces Melatonin in Animals and People](#)

[The Body Electric and Cross Currents](#)

### by Tirza Derflinger

*Founder, Author, Lead Educator, Speaker, CTT, MBA*

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<sup>1</sup> <http://www.holistichealthsecrets.com/aboutEMF.html>

<sup>2</sup> [http://www.mnwelldir.org/docs/misc/electrical\\_pollution.htm](http://www.mnwelldir.org/docs/misc/electrical_pollution.htm)

<sup>3</sup> <http://www.emfcenter.com/emffaq.htm#B10>

<sup>4</sup> Ibid.

<sup>5</sup> <http://www.biznet1.com/neutralizers/emf-hazard.html>

<sup>6</sup> <http://stopsmartmeters.org/frequently-asked-questions/radio-frequency-radiation-issues/>

<sup>7</sup> <http://www.safespaceprotection.com/overview-electromagnetic-fields.aspx>

<sup>8</sup> <http://www.biznet1.com/neutralizers/emf-hazard.html>

<sup>9</sup> [http://www.dirtyelectricity.ca/electrical\\_health\\_implications.htm](http://www.dirtyelectricity.ca/electrical_health_implications.htm)

<sup>10</sup> [http://www.dirtyelectricity.ca/electrical\\_health\\_implications.htm](http://www.dirtyelectricity.ca/electrical_health_implications.htm)

<sup>11</sup> [http://www.dirtyelectricity.ca/breast\\_cancer\\_and\\_emf.htm](http://www.dirtyelectricity.ca/breast_cancer_and_emf.htm)