



BRAG™ Antenna Ranking of Schools

Can you BRAG about your school?

Part Five

BRAG™ for Schools

- ✓ Recommendations
- ✓ Backgrounder
- ✓ Monitoring
- ✓ Mitigation



John F. Kennedy

A child miseducated is a child lost.



BRAG™ Antenna Ranking of Schools

Table of Contents

Part One: Executive Summary . . .

Part Two: Background . . .

Part Three: Method or What we did . . .

Part Four: Results . . .

Part Five: **BRAG™ Recommendations for Schools . . .** 🤨

Part Six: Sources & Links . . .

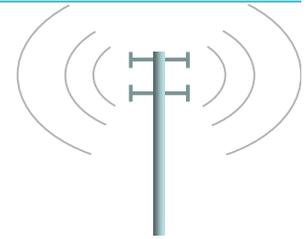


BRAG™ Antenna Ranking of Schools

The BRAG™ Antenna Ranking of Schools

Report

Recommends that . . .



- 1. Schools, school districts, all municipalities and states call upon the FCC for a ruling that requires a 1,500 feet setback for any/all wireless infrastructure near schools.** This is the distance at which the scientific literature indicates acute symptoms of electrohypersensitivity are not noticeable and background levels of radiation return to normal from most cellular infrastructure. *Note this does not apply to WiMax, a high-powered series of antennas being installed across the U.S., for which the return to background level distance is likely to be much greater than 1,500 feet.* Symptoms of electrohypersensitivity have been demonstrated at exposures that are a fraction (0.04%) of U.S. exposure guidelines, in part because the guidelines themselves only take into consideration a 30-minute exposure, not chronic exposures. Until guidelines are formally changed to reflect the current science, a policy of "prudent avoidance" would justify setbacks for antenna infrastructures near schools.
- 2. Radio frequency radiation in school environments be monitored and documented on a regular basis, and especially after antennas are erected nearby or when new wireless technology is introduced into the school environment.**
- 3. If levels of exposure to radiofrequency fields, magnetic fields or dirty electricity exceed the BRAG™ recommendations for these frequencies, that steps be taken to reduce these exposures on school property.**
- 4. Health complaints of electrohypersensitivity reported by students and staff be taken seriously, that they be documented, and that appropriate steps be taken in a timely fashion to address the complaint. This involves education of teachers and nursing staff.**

Note: those who want to conduct a BRAG™ antenna search for their school, visit www.magdahavas.com for "how to" instructions..



BRAG™ Antenna Ranking of Schools

Part Five

BRAG™ for

Recommendations Schools

- ✓ Recommendations
- ✓ Backgrounder
- ✓ Monitoring
- ✓ Mitigation



Nelson Mandela

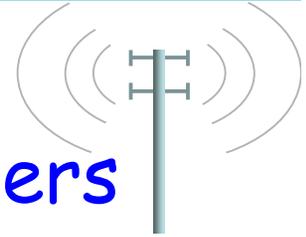
Education is the most powerful weapon which you can use to change the world.



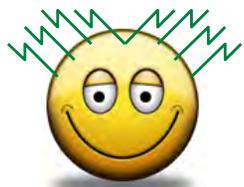
BRAG™ Antenna Ranking of Schools

Backgrounder

Meet the BRAG™ characters



There are at least three types of electromog in school environments. They include extremely low frequency (ELF) **magnetic fields**; **dirty electricity**; and **radio frequency radiation**. All of these operate at different frequencies (or vibrations) as shown by the signatures and characters below.



Magneta Field

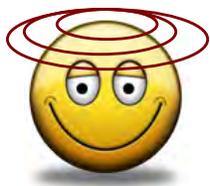
(magnetic personality, ELF Community)

signature



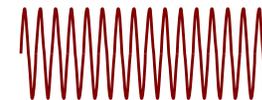
Doity Power alias 'Spiky'

(transient personality, Kilohertz Community)

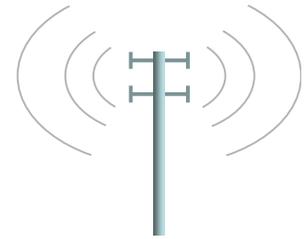


Radia Frequency

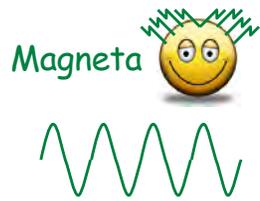
(high energy personality, Megahertz Community)



What is electrosmog?



Electrosmog refers to electromagnetic fields (EMF) and radio frequency radiation (RFR) generated by our use of electricity, electronic equipment, and wireless devices. Electrosmog, as it is used here, refers to LOW, INTERMEDIATE or HIGH frequencies within the non-ionizing part of the **electromagnetic spectrum**.



LOW frequency, technically called "extremely low frequency" (ELF), vibrates at or below 300 cycles per second (Hertz abbreviated to Hz) and includes electricity in North America at 60 Hz. Computers, photocopy machines, electric heaters, clock radios all generate ELF electric and magnetic fields. The closer someone stands to these devices the higher their exposure is likely to be. Wiring inside buildings can also generate electromagnetic fields, as can power lines or substations near a school.



INTERMEDIATE frequency refers to electromagnetic energy vibrating thousands of times per second. It is sometimes referred to as "dirty electricity" and is generated by electronic devices, transformers, fluorescent lighting, and computers. This energy flows along wires and radiates from them. Dirty electricity can also come into schools from nearby buildings. Filters can reduce dirty electricity on wires.

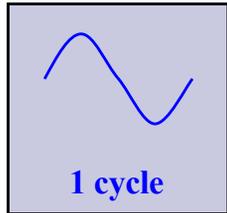


HIGH frequency is called "radio frequency radiation" and, at the top end of this scale are "microwaves" and "radar". These frequencies oscillate millions and billions of times per second and are generated by our wireless technology including wireless computers and routers, cell phones, cordless phones, wireless smart boards, smart meters, and wireless audio systems. Nearby cell phone antennas, city-wide WiFi, radio and TV antennas, as well as radar can contribute to exposure on school yards and inside school buildings.



BRAG™ Antenna Ranking of Schools

Waves



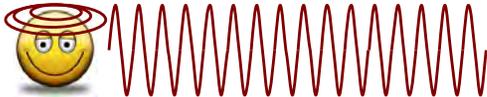
1 cycle

cycles/second = Hertz (Hz)

Frequencies

HIGH

Radio Frequency (MHz & GHz)



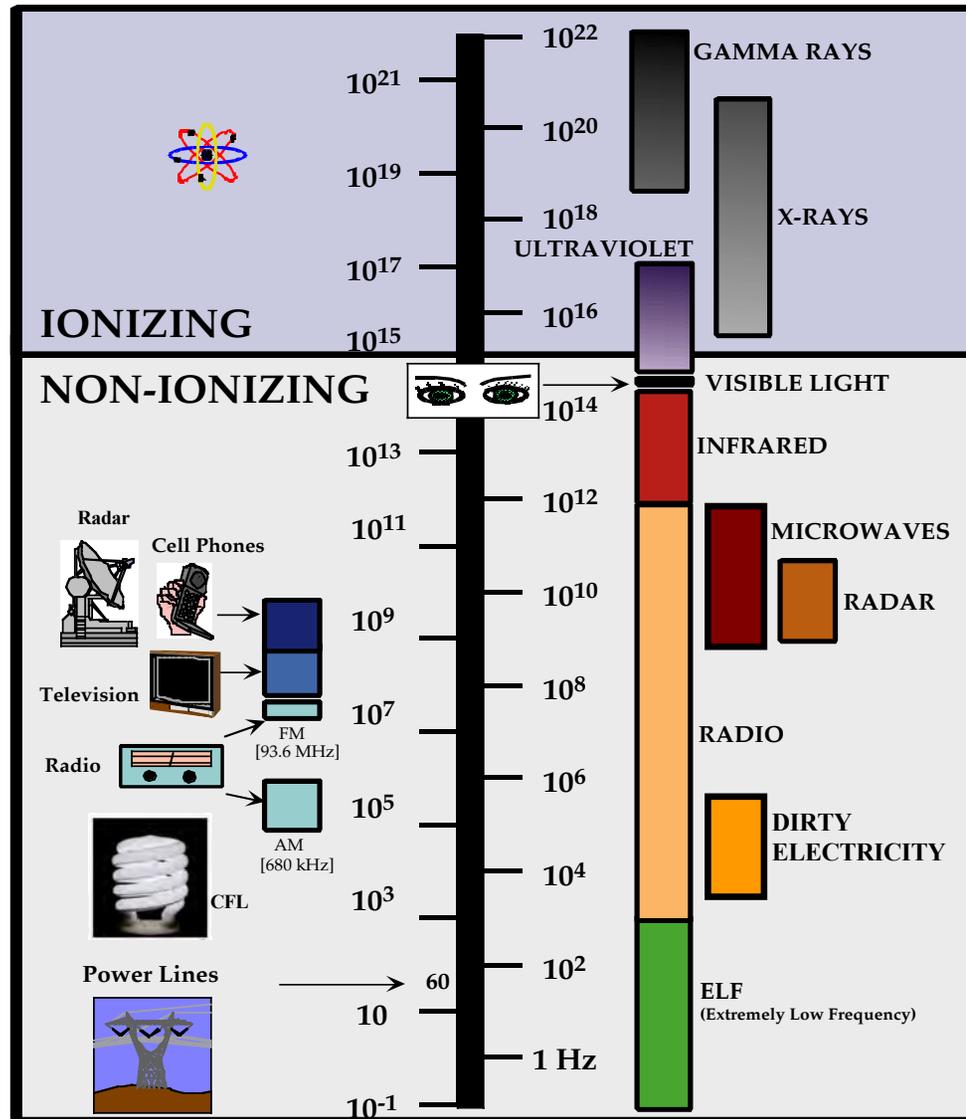
INTERMEDIATE

Dirty Electricity (kHz)

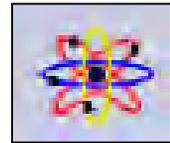


LOW

Electricity (<60 TO 300 Hz)



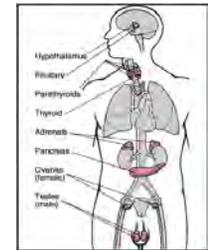
Effects



Ionization
(subatomic)

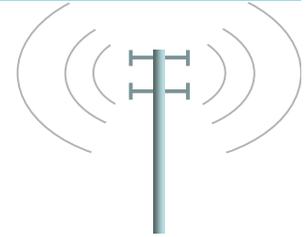


Thermal
(molecular)



Bio-effects
(sub-cellular to organism)

Electromagnetic Spectrum



Where does electrosmog come from?

Electrosmog can be generated within a school by computers, lighting, photocopier machines, cordless phones, wireless computers and WiFi antennas. It can also enter school buildings from nearby power lines, transformers, substations, cell phone antennas, radio and TV antennas, and from radar near airports, near military installations, or weather stations.

Electrosmog

Electromagnetic Fields



Dirty Electricity



Radio Frequency



frequency
cycles/sec (Hz)

LOW
< 300 Hertz

INTERMEDIATE
thousands Hertz

HIGH
millions & billions Hertz

sources inside
schools

building wiring
electric equipment

electronic equipment
lighting, computers

wireless technology,
for example routers, computers
mobile phones, smart boards,

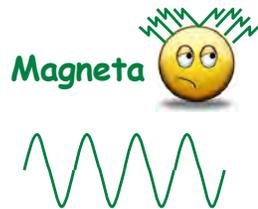
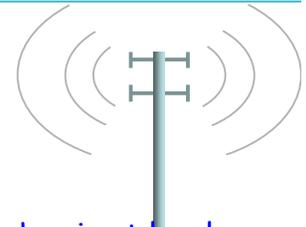
sources outside
schools

power lines
substations
transformers

nearby factories

antennas, for example
cell phone, broadcast,
radar, city-wide WiFi

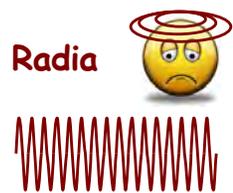
What are the health effects of electrosmog?



Extremely LOW frequency (ELF) electromagnetic fields have been associated with childhood leukemia at levels at or above 2 milli Gauss (mG) [this is the strength of the magnetic field]. The International Association for Research on Cancer (IARC) classified magnetic fields as a class 2B carcinogen (possibly carcinogenic). These fields have been associated with adult cancers (leukemia, brain tumors, and breast cancer) with occupational exposure at values between 2 and 12 mG. Miscarriages have also been linked to high magnetic field exposure during the first trimester of pregnancy (above 16 mG). For this reason it is important to keep magnetic fields in schools as low as possible and definitely below 2 mG. **Refer to scientific references on ELF magnetic fields.**



INTERMEDIATE frequencies, in the form of dirty electricity, have been linked to higher blood sugar among diabetics, tremors among those with multiple sclerosis, asthma, and a broad range of symptoms collectively called electrohypersensitivity (EHS). Symptoms of EHS include fatigue, chronic pain, mood disorders including depression and/or anxiety, difficulty concentrating and problems with short-term memory (not ideal in a school setting), nausea, dizziness, ringing in the ears, and skin disorders. These frequencies may contribute to attention deficit disorder, more research is needed to test this. **Refer to scientific references on dirty electricity.**



HIGH frequencies (radio frequency radiation, microwaves and radar) produced by wireless technology have been associated with hypersensitivity symptoms mentioned above as well as various types of cancer, especially leukemia for those living near antennas. Use of cell phones and cordless phones has been linked to various tumors of the head (including brain tumors, tumors of the acoustic nerve, eye, and salivary gland). Children are particularly vulnerable. **Refer to scientific references on radio frequency radiation.**

NOTE: The international scientific community has not come to a consensus on the health effects of electromagnetic energy at the frequencies mentioned above. There is controversy about biologically active frequencies and intensities and much remains to be learned about the mechanisms involved. We can wait for the science or we can invoke the "Precautionary Approach" and act now to promote cost-effective measures to reduce exposure and potential damage to the health of our children. Better safe than sorry! See BRAG™ Recommendations.



BRAG™ Antenna Ranking of Schools

Part Five

BRAG™ for

Recommendations Schools

- ✓ Recommendations
- ✓ Backgrounder
- ✓ Monitoring
- ✓ Mitigation



Eleanor Roosevelt

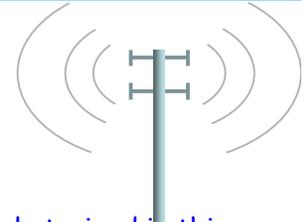
All of life is a constant education.



BRAG™ Antenna Ranking of Schools

Measuring Electrosmog

The only way to determine if electrosmog is present in your school is to measure it. Ideally this should be done by professionals trained in this area. However, since electrosmog is not recognized as an environmental pollutant there are few agencies that conduct these tests as part of their environmental assessment. In the meantime some of the testing can be done in-house with equipment that is not too expensive. For those schools or school boards that are willing to set aside funding to cover testing equipment, this is what I would recommend.



How do we know if Magneta Field* is in our school?

Trifield
Meter
magnetic fields



Elektrosmog
Analyser
magnetic & electric fields



Extremely Low Frequency (ELF) magnetic fields can be measured with a trifield meter. This is moderately good for magnetic fields but not for electric fields or for microwave radiation. Levels should be below 2 milliGauss (mG) and preferably below 1 mG in schools. Important to measure at each desk (at floor, seat, and head) for students and staff. Measure near electrical panels, computers, photocopy machines, and other electric equipment. Identify magnetic "hot spots" and make certain that people don't spend time near these areas. Remember that the magnetic field can come from electrical equipment/appliances, electrical wiring, and from external sources including power lines, substations, and transformers. The closer you move toward the source the higher the readings will be. Distance can make a difference in exposure to magnetic fields.

Trifield meters are made in the US by AlphaLab Inc. I recommend the EX100 Version. Cost under \$150. More expensive and more accurate meters (for example GigaHertz Solutions ME3851A) are available at www.lessemf.com.

Disclaimer: The author of this report does not receive any financial benefits related to the sale of any of the products mentioned in this document. They are provided here for those who want to start monitoring. Other products are available at the websites mentioned and at other sites.

***Magneta Field is the BRAG™ character for magnetic field.**



BRAG™ Antenna Ranking of Schools

How do we know if

Doity Power* is in our school?



Microsurge Meter
to measure dirty electricity

INTERMEDIATE frequencies or dirty electricity on wires can be measured with a microsurge meter. You plug this meter into an electrical outlet and it will provide information on the amount of dirty electricity on the wires measured in GS units. These units are frequency and intensity dependent and measure the "energy" associated with high frequency microsurgers or spikes on wiring from 4 to 150 kHz. For more information about dirty electricity visit www.electricalpollution.com.

Ideally the values should be less than 40 GS units but many schools will have values in the 100s and some will have readings above 1,000. A study in California showed that teachers had a higher risk of cancer if they ever taught in a room where the readings were above, 2000 GS units (see Milham and Morgan 2009). It is important to test outlets in classrooms and offices where people spend hours each day.



GS Filter
to reduce dirty electricity
between the range of 4 to 100 kHz

If your school has dirty electricity, the levels can be reduced with special power surge filters. Some work at kHz frequencies (GS filter) and some at MHz frequencies (Belkin). Using both of these surge suppressors provides an inexpensive insurance policy against dirty electricity and also protects sensitive computer equipment. KHz frequencies are easy to measure with a GS meter, however, MHz frequencies are more difficult to measure and require expensive monitoring equipment (scope meter).

The microsurge meter and GS filters are produced by Stetzer Electric in Blair, Wisconsin and are available at www.stetzelectric.com. Belkin surge suppressors can be purchased at hardware stores.



Belkin Surge Suppressors
to reduce dirty electricity in the range of
150 kHz to 100 MHz



Disclaimer: The author of this report does not receive any financial benefits related to the sale of any of the products mentioned in this document. They are provided here for those who want to start monitoring. Other products are available at the websites mentioned and at other sites.

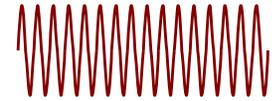
*Doity Power is the BRAG™ character for dirty electricity.



BRAG™ Antenna Ranking of Schools

How do we know if

Radio Frequency* is in our school?



Radio Frequency



Electromog Detector
to measure radio frequency radiation
50 to 3000 MHz

HIGH frequencies (radio frequency radiation, microwaves and radar) from wireless technology can be measured using a variety of meters that vary in price, accuracy, and frequency range.

The Electromog Detector is an inexpensive (~\$100) and useful meter that detects frequencies from 50 MHz to 3000 MHz. This includes cell phone frequencies, DECT cordless phone frequencies, WiFi and even microwave ovens. All of these sources emit microwave frequencies and the detector provides an audio output that relates to the type and intensity of exposure. See www.safelivingtechnologies.ca for examples. The closer the source and the higher the intensity of radio frequency radiation, the louder the sound emitted by this meter. This meter is ideal for detecting exposure and locating the source. However, it does not provide an actual reading of power density.



High Frequency Meter
to measure radio frequencies
800 MHz to 2.5 GHz

Accurate meters that measure a broad range of frequencies are expensive (hundreds to thousands of dollars). For a list of recommended meters visit www.microwavenews.com (EMF/EMR meters), www.lessemf.com.



Spectran Analyzer
to measure radio frequencies
100 MHz to 6 GHz



8 GHz RF Meter
to measure radio frequencies
10 MHz to 8 GHz

Disclaimer: The author of this report does not receive any financial benefits related to the sale of any of the products mentioned in this document. They are provided here for those who want to start monitoring. Other products are available at the websites mentioned and at other sites.

*Radio Frequency is the BRAG™ character for radio frequency radiation including microwave radiation.



BRAG™ Antenna Ranking of Schools

Part Five

BRAG™ for

Recommendations Schools

- ✓ Recommendations
- ✓ Backgrounder
- ✓ Monitoring
- ✓ Mitigation



Margaret Mead

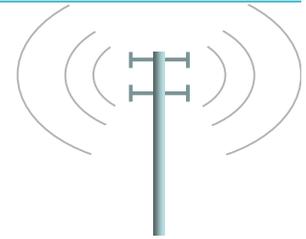
Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has.



BRAG™ Antenna Ranking of Schools

BRAG™ Recommendations for Schools

How to minimize **Magnetic Fields** and establish good electromagnetic hygiene.



Ideally magnetic fields should be less than 1 milliGauss (mG). Levels of 2 to 4 mG have been associated with childhood leukemia. Levels of 2 to 12 mG have been associated with breast cancer as well as adult leukemia and brain tumors. Levels of 16 mG have been associated with increased risk of miscarriages (Havas 2000). Magnetic fields have been classified by the National Institute of Environmental Health Sciences as a Class 2b Carcinogen, "possibly carcinogenic".

What to do . . .

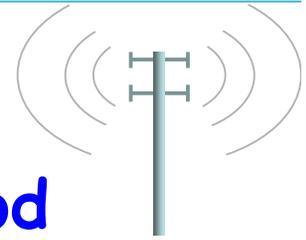
- If the magnetic field is coming from **electric/electronic sources** (computers, photocopy machine, etc.), move the equipment further away from where students and staff work. Even a few feet can make a big difference. This is particularly important at computer work stations. Aim to have levels of magnetic fields less than 1 milliGauss, if possible.
- If the magnetic field is coming from **wiring inside the wall or under the floor**, move desks far enough away to reduce the magnetic field to less than 1 mG, if possible.
- In some cases, faulty wiring can lead to high magnetic fields and this requires rewiring.
- If the magnetic field is coming from **power lines, transformers, or substations** outside the school, little can be done to reduce exposure within the school without expensive shielding. High voltage power lines should not be built near schools.



BRAG™ Antenna Ranking of Schools

BRAG™ Recommendations for Schools

How to minimize **Dirty Electricity** and establish good electromagnetic hygiene.



Little research has been done on the biological effects of dirty electricity. What research exists shows that dirty electricity exacerbates symptoms of asthma among school children, diabetes, multiple sclerosis, and symptoms of electrohypersensitivity that include difficulty concentrating, poor short-term memory, dizziness, nausea, depression, anxiety, fatigue, pain, skin problems, ringing in the ears, etc. It may be related to ADD/ADHD and possibly to autism, although much of the evidence is anecdotal. A scientific study that involved reducing dirty electricity in three Minnesota schools documented improvements in the health, mood and energy of teachers and the behavior of students. Teachers in classrooms with high levels of dirty electricity (>2000 GS units) have a greater risk of developing cancer according to a study in a California school.

What to do . . .

- Until electronic equipment is manufactured without producing dirty power, filters are necessary to keep the levels of dirty electricity as low as possible
- Ideally dirty electricity should be less than 40 GS units on a microsurge meter. If levels within a classroom are higher, they can be reduced with appropriate filters/capacitors that plug into an electrical outlet.
- A school needs 2 GS filters for each computer, photocopy machine, television set. If fluorescent lighting is used, additional filters may be required (see information about filters on page 158).



BRAG™ Antenna Ranking of Schools

BRAG™ Recommendations for Schools

How to minimize Radio Frequency Radiation and establish good electromagnetic hygiene.



Radio frequency and microwave radiation at levels below existing federal guidelines have been shown to have adverse biological and health effects. Studies report increased incidence of cancers and symptoms of electrohypersensitivity near cell phone antennas, often within 300 and 400 meters (~0.25 miles) and at levels that are less than 0.1% of existing guidelines (see references in Part Six). Symptoms include fatigue, sleep disturbances, headaches, depression, difficulty concentrating, memory loss, visual and hearing disruptions, irritability, cardiovascular problems, skin problems, and dizziness. Symptoms such as these would be counterproductive to learning in a school setting. If staff or students experience these symptoms, the school should be monitored for electrosmog, for chemical exposure, and for mold. It is highly recommended that schools classified as BRAG™ **red** or **black** be monitored for radio frequency radiation. If levels in classrooms exceed 0.1 microW/cm^2 , steps need to be taken to reduce exposure.

What to do . . .

- Replace wireless technology (cordless phones, wireless routers, wireless headsets) with wired technology within the school building. Fiber optic technology is faster, more secure than wireless routers and it does not emit microwave radiation.
- Do not permit cell phone, broadcast, or radar antennas near schools. Cell phone antennas should be at least 1,500 feet away, and broadcast and radar antennas, depending on their strength, should be at least 2 miles away from schools.
- If antennas are near school property and radiation levels within the school are above $0.1 \text{ microWatts/cm}^2$, then special film can be placed on windows to reflect the radiation and special paint can be put on walls and ceilings to keep the levels as low as possible.
- It is important NOT to renew licenses of antennas near schools once they expire.