

**Michael R. Neuert, MA, BSME**  
**Neuert Electric & Electromagnetic Services**  
3343 Primrose Avenue, Santa Rosa, CA 95407  
(707) 578-1645 or 1-800-638-3781  
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## **Alpha UHS Milligauss Meter Instructions (Model UHS2)**

### **Important Note About the Battery!**

The UHS Meter uses a standard 9 volt battery. *We recommend that you replace the battery as soon as the “LOBATT” indicator light comes on and stays on, or if you suddenly get unusual or strange measurements.*

To replace the battery, slide off the back door at the bottom of the meter. When you insert the new battery, make sure the positive [+] and negative [-] posts of the battery match up properly with the positive and negative terminals in the battery compartment. *In other words, the narrow battery post should fit into the narrow terminal slot, and the wide battery post into the wide slot.* Inserting the battery backwards could burn out the circuit board.

Please note that if you continue to use the UHS meter with the LOBATT light on, the test meter will begin to lose accuracy. After a while, the battery might drain down to the point where the LOBATT light goes out due to lack of power, but a measurement number may still show in the display. *This number would be inaccurate.*

So when in doubt, always install a new battery to be sure. And remember, be sure to turn off the meter after you use it, or the battery will run down and need to be replaced sooner.

### ***How to Turn On Your Meter...***

To use the UHS Meter, turn the knob one position towards the right, from “OFF” to “3-AXIS ELF+VLF”. *This is the knob position you will normally use for all of your testing.* In this setting, the meter will measure the total strength of the magnetic field in all directions, and will include both the ELF and VLF types of magnetic fields.

Note: “ELF” stands for “*extremely low frequency*” and includes the common 60 Hertz magnetic fields from power lines, wiring, electrical panels, lights, appliances, and other devices. “VLF” stands for “*very low frequency*” and includes the higher frequencies (e.g., 10,000 Hertz and more) that are emitted from fluorescent lights, computers, televisions and other electronics. (Hertz is just a scientific term for how many “times per second” something occurs, e.g., 60 Hertz means 60 times per second.)

The Alpha UHS Meter is unusually helpful because it can measure both kinds of magnetic fields – the ELF and the VLF. In contrast, most other gaussmeters can only detect the ELF frequencies, and thus they will completely miss detecting any of the VLF fields which are also important.

If you want to measure only the VLF frequencies, turn the knob one more position to “3-AXIS VLF”. And if desired, you can then calculate the strength of the ELF fields alone by subtracting the “3-AXIS VLF” measurement from the “3-AXIS ELF+VLF” measurement. (In most cases the VLF reading will be insignificant, unless you are close enough to a particular VLF source like a computer.)

Finally, we recommend that most people do not use the “1-AXIS” knob position at all, because most users will greatly underestimate the field strength using this setting. This single-axis feature is helpful only for more advanced troubleshooting purposes.

### ***How to Take a Measurement...***

To take a measurement, turn the meter on as described above. Then position the meter wherever you wish to test, and hold it still for a few seconds. Record the measurement given on the display, *and pay careful attention to the decimal point!*

Place the meter in any location you wish to test – in your bed, at your computer, on your couch, outside where children play, and anywhere where people spend significant time. The UHS meter measures the magnetic field strength in units called “*milligauss*” (abbreviated “*mG*”).

Notice that your gaussmeter will tend to read higher when it is being moved or shaken. This is because it temporarily picks up some of the earth’s magnetic field whenever you move. To get an accurate reading, always hold the meter still for a moment, and then read the magnetic field strength from the display.

When you write down the measurement, you can usually round off the number to the nearest tenth of a milligauss. For example, a reading of 1.44 could be rounded down to 1.4 mG, and 1.46 could be rounded up to 1.5 mG. The meter is only accurate to within about +/- 0.1 mG, so the hundredth of a milligauss is not really significant or accurate anyway.

Note: It is easy to get an accurate measurement with the Alpha UHS Meter because it is a triple-axis (“3-axis”) type of gaussmeter. This means that you can hold it in any orientation or direction and still get a good reading. Most other gaussmeters are single-axis (“1-axis”) meters, and therefore they must be properly oriented to determine the strongest field direction. And for truly accurate readings, the user must take three directional measurements and do some math to calculate the total field strength.

### ***What are the Health Concerns?***

Published studies from around the world have linked electromagnetic fields (EMFs) to increased stress, suppression of the immune system, important changes to cellular and hormone functions, psychological disorders including depression and suicide, and increased risks of cancer. In fact, thousands of studies have now reported important biological effects related to EMFs.

Some specific illnesses that have been linked to EMFs include leukemia, lymphoma, brain tumors, melanoma, breast cancer, asthma, Alzheimer's disease, Lou Gehrig's disease, miscarriage and birth defects. Anecdotally, EMFs have also been associated with sleep problems, headaches, fatigue, anxiety, mental confusion, memory loss, dizziness, itchy red or burning skin, tinnitus and other concerns.

*Magnetic fields* in particular are the type of EMF that is most often linked to serious health effects in the scientific literature – including leukemia, lymphoma, brain and nervous system tumors, and suppression of the immune system. (Note: The UHS Meter measures these *magnetic fields*. However, gaussmeters like the UHS do not detect the other two kinds of EMFs – electric fields and radio frequencies – which may also have health effects but require other types of meters.)

Common sources of *magnetic fields* include power lines, electric panels, hidden electrical wires, lights, appliances and almost every device that runs on regular electricity. Surprisingly high levels can be caused by electrical wiring errors and stray electrical current flowing in metal water pipes. In the United States and Canada, the magnetic fields are usually measured in units called “milligauss” (mG).

### ***What EMF Level is Considered Safe?***

There is still a great controversy about the potential health effects from exposure to *magnetic fields*. Please consult with the proper medical authorities and scientific research literature about recommended safety levels and possible health risks. The following information is provided to offer some assistance. (For a summary, please see Figure 1, on page 4.)

A series of international research studies have linked *ELF magnetic fields* from power lines to increased leukemia, lymphoma, and nervous system tumors in children. The strongest evidence comes from a large Swedish epidemiological study which reported increased leukemia for children at levels as low as 2.0 mG (Feychting & Ahlbom, 1993). Therefore, some authorities suggest that concerned individuals consider 2.0 mG as an appropriate safety level.

However at even lower levels, a Canadian study has reported increased leukemia starting at only 1.5 mG for children under age six (Green, Miller Villeneuve, Agnew, Greenberg, Li & Donnelly, 1999). And a German study has linked exposures as low as 1.0 mG to reduced survival rates for children recovering from leukemia (Svendsen, Weikopf, Kaatsch & Schuz, 2007).

**Figure 1: EMF SAFETY LEVELS<sup>8</sup> for Consideration**

<b><u>Safety Guidelines for Possible Consideration</u></b>	<b><i>ELF Magnetic Fields</i></b>
Unit of Measurement in USA → (Abbreviation)	Milligauss (mG)
<b>Lowest Level Linked to Cancer</b> <small>See Note 1</small>	<b>1.0 (2.0)</b>
<b>Average Level in US Homes</b> <small>See Note 2</small>	<b>0.5 to 1.0</b>
<b>BioInitiative Report Recommendations</b> <small>See Note 3</small>	<b>1.0</b>
<b>General Public Cautionary Level</b> <small>See Note 4</small>	<b>0.5</b>
<b>EMF Hypersensitivity Advisory</b> <small>See Note 5</small>	<b>0.1</b>
<b>FCC Guidelines for General Public</b> <small>See Note 6</small>	N/A
<b>ICNIRP Guidelines for General Public</b> <small>See Note 7</small>	<b>2000</b>

<sup>1</sup> The Lowest Level Linked to Cancer. For *magnetic fields*, the strongest evidence comes from the Swedish epidemiological study which reported increased leukemia for children at levels of 2.0 mG or more (Feychting & Ahlbom, 1993). Also, a Canadian study has reported increased leukemia starting at 1.5 mG for children under age six (Green, Miller Villeneuve, Agnew, Greenberg, Li & Donnelly, 1999). And a German study has linked exposures as low as 1.0 mG to reduced survival rates for children recovering from leukemia (Svendsen, Weikopf, Kaatsch & Schuz, 2007).

<sup>2</sup> The Average Level in US Homes for *magnetic fields* is derived from nationwide research studies and confirmed by my own testing experience. The average levels for *electric fields* and *RF fields* are estimates based on my 20 years of professional testing in the San Francisco Bay area.

<sup>3</sup> The BioInitiative Report Recommendations are from the 2007 "BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields" (go to [www.bioinitiative.org](http://www.bioinitiative.org)).

<sup>4</sup> The General Public Cautionary Level is my own offering to concerned clients *based on my own understanding of the EMF research*, and leaning toward precaution. For example, to offer some margin of safety below the 1.0 mG linked to cancer, I might suggest a safety level of 0.5 mG.

<sup>5</sup> The EMF Hypersensitivity Advisory is a very strict standard that colleagues like myself sometimes offer to EMF-sensitive clients. Based on anecdotal experience, we have found that it is often necessary to get exposures well below these levels for sensitive individuals to report relief of symptoms. (*Note: There is no guarantee that these advisory levels will be low enough for any particular person. This is especially true for RF exposure, as some individuals report symptoms at surprisingly low levels.*)

<sup>6</sup> The FCC Guidelines for General Public show the current US standards for *Radio Frequency* exposure from FCC/OET Bulletin 56. The FCC does not regulate human exposure to ELF magnetic fields (go to [http://www.fcc.gov/Bureaus/Engineering\\_Technology/Documents/bulletins/oet56/oet56e4.pdf](http://www.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet56/oet56e4.pdf)).

<sup>7</sup> The ICNIRP Guidelines for General Public are from the 2010 publication by the International Commission on Non-Ionizing Radiation Protection (<http://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf>).

<sup>8</sup> I am engineer, not a medical doctor, and I cannot diagnose or treat any EMF-related health problems. *Please consult with your own doctor or other medical professional regarding proper exposure guidelines.*

Based on this evidence, the human safety level that has been recommended by a group of concerned EMF research scientists in the 2007 “BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields” is only 1.0 mG. (For more information, go to [www.bioinitiative.org](http://www.bioinitiative.org)).

Interestingly, when a chemical toxin is discovered, the exposure limit usually includes an added margin of safety below the known toxic level. Thus to provide a margin of safety for *magnetic fields*, many concerned individuals will choose a safety limit below the 2.0 mG level from the Swedish study, and in some cases, below the 1.0 mG level reported in the German study.

Therefore in my own professional work with clients, we usually try to reduce long-term exposures down to 0.5 mG or less. Since there is no guarantee that 0.5 mG or any level is completely safe, it may be wise to reduce any exposures as much as reasonably possible.

For clients experiencing serious health issues such as cancer, auto-immune disease, chronic fatigue or Lyme Disease, and for individuals with a debilitating sensitivity to EMFs (sometimes called electromagnetic hypersensitivity or “EHS”), we usually try to reduce magnetic field exposure levels even further, often down to 0.1 mG or less.

Note: Studies have found that the “*average level*” of magnetic fields in homes across the United States is approximately between 0.5 and 1.0 mG. From my own professional experience, I would estimate that the average level in rural homes is probably about 0.5 mG. The average level in the typical single-family suburban home is probably around 0.7 or 0.8 mG. And the average for homes in dense urban areas like San Francisco and New York City – as well as in apartment buildings, commercial buildings and offices – is probably about 1.0 mG.

### ***How to Reduce the Magnetic Fields...***

In many homes, certain locations will have higher levels, while other areas may be lower. Using the measurements from your UHS Meter, you may be able to rearrange your environment to avoid the highest magnetic fields. For example, you can place beds, couches, desks and playpens in the lowest field areas, and use the higher exposure areas for storage or other seldom-used purposes.

Sometimes you can determine exactly what is causing the magnetic fields by turning off one light, appliance, or circuit breaker at a time. Try turning off all the power at the main panel, and if the magnetic fields are still relatively high, the source is probably from nearby power lines or stray electrical current in municipal water pipes.

And a good way to reduce your overall EMF exposure in the long run, is to use your UHS gaussmeter to pre-test potential new homes and apartments before you buy or rent them. It is usually much easier to avoid a high field situation ahead of time, rather than trying to fix it later. Your meter is also very useful to pre-test automobiles, computers, televisions and other items before you purchase them.

***If You Need Professional Assistance...***

We provide EMF telephone consultations to help guide you through the proper steps to test and reduce the magnetic fields from power lines, building wiring, computers, appliances and many other common sources.

We consult with homeowners, architects, electricians, contractors and others, *and provide specific advice for your particular situation.* For new and remodel construction projects, we can recommend the proper materials and methods to reduce the EMFs that are emitted from building wiring systems.

All EMF consultations are with Michael Neuert, an engineer and licensed electrical contractor in California. Michael is the owner of Neuert Electric & Electromagnetic Services and EMFCenter.com, and has over 25 years of professional experience related to the testing and reduction of EMFs.

The phone consultation fee with Michael Neuert is \$150 per hour (prorated for actual time used, with a 10 minute minimum). In northern California, we can also provide on-site EMF testing, shielding, troubleshooting, repairs, the installation of specially shielded low-EMF electrical wiring, and other consultation services.

If you need further assistance, *please contact our office at 707-578-1645 or 1-800-638-3781 to set up an appointment.*

*Thank you.*

*Michael and the staff*

*Michael R. Neuert, MA, BSME  
EMF Engineering Consultant & Contractor  
Neuert Electric & Electromagnetic Services*

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