

EMF TESTING, ANALYSIS, AND MITIGATION SERVICES



Educational Series: Why Test?

Why Test?

Interference from power frequency electromagnetic fields (EMF) has become more prevalent with the increasing use of electronic equipment. It can cause problems with medical and IT equipment and has raised health concerns. Most EMF testing is requested after one of the following occurs:

- Developers, property owners or local governmental agencies develop concerns about EMF produced by planned or existing power lines.
- Equipment that uses scanning electron beam devices (electron microscopes, high-resolution graphic scanners, laboratory and production equipment) misoperated due to EMF interference.
- Computer monitor images are distorted, resulting in productivity issues.
- High-speed computer processors misoperate due to EMF interference.
- Data network systems suffer loss of data and increased error rates due to EMF influence.
- Sensitive audio and other equipment performance falls off due to decreased signal-to-noise ratios.

High and Low Frequency Fields

There is a big difference between high frequency fields and low frequency fields. EMFs produced by television antennas and microwaves are in the very high frequency (VHF) and ultra high frequency

(UHF) ranges. Such fields react very differently than the low frequency magnetic fields produced by electrical equipment and power circuits.

There are several consultants that have the ability to mitigate EMF from high frequency sources. However applying the typical high frequency solutions to low frequency EMF problems normally does not work.

Which Tests? What Mitigation?

Power frequency magnetic fields can pass through walls, cement floors, lead and the earth itself. It is often difficult to determine the cause of an interference problem. It takes specially trained engineers and technicians using sensitive equipment to measure the intensity of magnetic fields (in units of Tesla or Gauss). ANSI/IEEE 644 is the primary standard for measurement of power frequency electric and magnetic fields. Using computer software, the measured data is plotted on a three-dimensional grid to help determine the source and type of magnetic fields causing the interference.

Solving the Problem

The solution depends on what is found. In many buildings, power frequency interference is caused by common wiring problems. These create fields from unwanted “net currents” or excess ground currents (sometimes called stray currents). Identifying and correcting these wiring problems often restores proper equipment operation, mitigates the stray currents and corrects associated National Electrical Code violations.

In other cases, different types of mitigation may be required. It may be possible to reduce the magnetic field to an acceptable level by increasing the distance between the magnetic field source and the affected people or equipment. In other situations, it may be necessary to install a specially designed multi-layered shield. These sophisticated shields are very different from shields for high frequency protection, which sometimes use copper mesh to block the high frequency fields.

Address EMF Issues Early

Some buildings have severe magnetic field interference problems that have been inherited or created over the years. This is a result of adding new equipment, wiring changes or other modifications. The good news is that such problems can be identified and corrected.

The ideal time to consider the effects of power frequency magnetic fields on sensitive electronic equipment is during the building design or remodel stage. A short consultation or plan review with an experienced EMF engineer before or during remodeling can be the quickest and the most cost effective method to avoid interference problems.

For existing buildings experiencing EMF interference, mitigation can be complicated, but it is still very achievable. Through testing, analysis and calculation, the cause of the interference can be identified and proven mitigation techniques can be implemented.