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Electronics & Electrical Equipment

What is the Difference Between RF and EMF Radiation?

Laboratories are needed to test RF and EMF emissions for a variety of products ranging from cellphones to power lines.

by Pam Wertalik | Mar 15, 2024



RF and EMF radiation are different aspects of electromagnetic energy |Credit Pixabay

RF (Radio Frequency) and EMF (Electromagnetic Fields) radiation are related but are different aspects of the electromagnetic phenomena. Here's a brief explanation of each, along with how their levels are typically measured:

- **RF (Radio Frequency) Radiation** refers to the oscillation of electromagnetic waves in the frequency range associated with radio waves, microwaves, and other types of wireless communication. Common sources of RF radiation include cell phones, Wi-Fi routers, microwave ovens, radio and television broadcasts, and various wireless devices. RF radiation is measured in units of hertz (Hz) or gigahertz (GHz), depending on the frequency of the electromagnetic waves.
- **EMF (Electromagnetic Field) Radiation** refers to the broader electromagnetic field encompassing a range of frequencies, not just those associated with radio waves. It includes electric fields, magnetic fields, and electromagnetic radiation across the entire spectrum, from extremely low frequency (ELF) fields to RF fields. EMF can be produced by both natural sources (such as the Earth's magnetic field) and human-made sources (such as power lines, electrical appliances, and wireless communication devices).

How are RF Radiation and EMF Radiation Measured?

- Laboratories measure RF Radiation levels in terms of power density or field strength with RF Meters. Power density is measured in units like watts per square meter (W/m^2) or milliwatts per square centimeter (mW/cm^2). Field strength is measured in volts per meter (V/m) for electric fields or amperes per meter (A/m) for magnetic fields.
- EMF Radiation Measurement involves assessing the electric and magnetic fields separately with electric field meters, magnetic field meters, and gaussmeters. Electric field strength is measured in volts per meter (V/m), while magnetic field strength is measured in amperes per meter (A/m) or tesla (T).

How Contract Laboratory Assists with RF Radiation and EMF Radiation Measurements

Contract Laboratory regularly receives requests for RF and EMF Testing. Here is a sample of recent requests we have assisted with.

- Contract Laboratory needed for cellphones, laptops, and tablets testing to measure RF/EMF radiation levels. We could discuss further methods and standards. The idea is to measure levels of EMF/RF, Specific Absorption rates to verify our measures are similar to a professional Lab environment.
- Electrical Laboratory needed for Electromagnetic Field Testing (EMF Test) of solar-powered GPS Tracker Device 1. LTE CAT M-1 Band 5 (Tx. 824-849 MHz Rx. 869-894 MHz) 2. LTE NB-IoT Band 5 (Tx. 824-849 MHz Rx. 869-894 MHz) of Solar powered GPS tracker device
- Military Company needs an Electrical Laboratory for EMF immunity for use in substations. What strength of field are you able to generate at your facility at 60 Hz for testing? We have units ready for testing for laboratories that can produce strong enough fields.
- Large watch manufacturer needs a laboratory to conduct a study on Electromagnetic Field EMF technology and its protective properties.
- A retailer needs an Electrical Laboratory for performance evaluation of infrared incandescent bulbs with a series of confirmatory specification tests done on the bulbs including the output distribution by wavelength, intensity, and EMF emission. Please contact me to discuss this in greater detail.

Contract Laboratory connects manufacturers, suppliers, and distributors with testing labs worldwide. If

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- **Pam Wertalik**
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