Electromagnetic Radiation Safety

Scientific and policy developments regarding the health effects of electromagnetic radiation exposure from cell phones, wireless, Wi-Fi, smart meters, and other wireless technology including 5G, the 7th generation of cellular technology. This website has had more than two million page views. @ferkingson

Sharing posts cannot be secure for your **collaborator** users. Sign in to Share. Share all posts.

David M. Ferkingson, Ph.D.
Retired Research Scientist
Retired Adjunct Professor
Retired Consultant
Retired Author
Retired Expert Witness
Retired Research Scientist Research Grants
Retired Adjunct Professor Teaching Grants
Retired Research or Review Articles and Doctoral Dissertations Supervisor
Retired Consultant to Industry, Government, and Academia
Writing Assistance Today
Electromagnetic Hypersensitivity
Electromagnetic Radiation Safety
5G Wireless Technology: Millimeter Wave Health Effects
Electromagnetic Radiation Safety
Electromagnetic Hypersensitivity Bibliography
Scientific Bibliography
Wireless Technology Bibliography
Wireless in CAM Fields

2021 (1)
2020 (1)
2019 (1)
2018 (1)
2017 (1)
2016 (1)
2015 (1)
2014 (1)
2013 (1)
2012 (1)
2011 (1)

Posts

5G Wireless Technology: Millimeter Wave Health Effects

Dec. 31, 2018 (Updated Feb. 27, 2019)

The emergence of **5G**, fifth generation telecommunications technology, has been in the news lately because of the potential health effects of the millimeter wavelength component of the technology. This is a major departure from the technology. The legislators would like the rollout of next generation wireless technology to be as rapid as possible. Industry would like to see 5G technology in place to compete with China and other countries who are willing spend many 10-20 fold more in other areas. According to the industry, as many as 50,000 new cell sites will be needed in the United States to provide the new 5G wireless technology.

Some have said that 5G does not pose a health risk because the wavelength is too short to have any effect on living tissue. There are several scientific reports that question the wisdom of this frequency.

5G will utilize bands of 24 GHz, 37 GHz, 39 GHz, and 64-71 GHz. Wavelength of 5G is 1 to 10 mm. The National Communications Commission (FCC) has allocated "low-band" spectrum at 3.55 to 3.7 GHz, "mid-band" spectrum at 3.7 to 24 GHz, and "high-band" spectrum at 24 GHz to 90 GHz for the new 5G wireless technology.

This is a dedicated electromagnetic range and will be used for short-range communications. Because of the short wavelength, it will be absorbed by the skin and will not penetrate very far into the body. Because of the short wavelength and inadequate penetration it has the theoretical advantage that the cells will not be affected by the radiation.

The characteristics of MMWs are different than the "low-band" (i.e., microwave frequencies which are currently in use for cellular communications). Because of the short wavelength, it will be absorbed by the skin and will not penetrate very far into the body. Because of the short wavelength and inadequate penetration it has the theoretical advantage that the cells will not be affected by the radiation. Although this is true for most of the cells, there are some exceptions to this statement. Some cells are very long. Nerve cells are the most obvious. Although attenuated as it does not reach the cell nucleus, "short-range" effects are possible. Nerve cells are the most obvious.

What does research tell us about the biologic and health effects of millimeter waves?

Millimeter waves (MMWs) are made electromagnetic with 1-10 millimeters of wave-length and in the radiation frequency range of 30 to 300 gigahertz (GHz). Because of the short wavelength, MMWs are absorbed by the skin and do not penetrate very far into the body. Because of the short wavelength and inadequate penetration it has the theoretical advantage that the cells will not be affected by the radiation.

Exposure to healthy effects (over the years already of the study of exposure to millimeter waves) of the human body, which is 70% water, is a matter of concern. Because of the short wavelength and inadequate penetration it has the theoretical advantage of safety exposures. Occupational exposure can occur in industry, medicine, and research. Medical exposure can occur with therapeutic or diagnostic devices.

The maximum permissible exposure level for FCC controls for the general public is 1 mW/cm2 (average over 30 minutes) for frequencies between 1 and 300 GHz. Because of the short wavelength and inadequate penetration it has the theoretical advantage that the cells will not be affected by the radiation. Although this is true for most of the cells, there are some exceptions to this statement. Some cells are very long. Nerve cells are the most obvious.

Although the biologic effects of low intensity MMW have been studied for decades, particularly in Eastern Europe, results are not well known in the United States. Although attenuated as it does not reach the cell nucleus, "short-range" effects are possible. Nerve cells are the most obvious.

Results vary across studies. MMWs have been shown to induce or inhibit cell death and enhance or suppress cell proliferation. Results vary across studies. Because of the short wavelength and inadequate penetration it has the theoretical advantage that the cells will not be affected by the radiation.

A review of the research in 2001 found that most studies reported that MMWs had a biologic effect but only about one-third of the studies reported that the effect was harmful. The effect of MMWs on the immune system was the most consistent and was by inhibiting the production of cytokines. Nerve cells are the most obvious. Although attenuated as it does not reach the cell nucleus, "short-range" effects are possible. Although this is true for most of the cells, there are some exceptions to this statement. Some cells are very long. Nerve cells are the most obvious.

Although the biologic effects of low intensity MMW have been studied for decades, particularly in Eastern Europe, results are not well known in the United States. Although this is true for most of the cells, there are some exceptions to this statement. Some cells are very long. Nerve cells are the most obvious.

Results vary across studies. MMWs have been shown to induce or inhibit cell death and enhance or suppress cell proliferation. Although this is true for most of the cells, there are some exceptions to this statement. Some cells are very long. Nerve cells are the most obvious

Ultra-Wideband Technology for Medical Applications, Ultra-Wideband Technology for Medical Applications, Ultra-Wideband Technology for Medical Applications,

Abstract

In a world where many overlapping 5G, 3G, and IoT electromagnetic radiation sources already exist, concerns regarding the potential increase of these radiation levels following the roll-out of 5G networks are growing. The deployment of 5G is expected to increase the number of radio base stations, and the use of higher frequency bands and beamforming will result in a change in the nature of radio emissions from a point source to a grid of 5G hotspots. In this study, we have used Electromagnetic Topology (EMT) to model the radiation from a 5G base station and a 3G base station in a typical indoor environment. The accuracy of the EMT simulations is verified by comparing the measured fields in the environment with the simulated fields. The EMT simulations are used to study the propagation of the radiation from the base stations and to study the electromagnetic exposure from EMF exposure levels and specific absorption rate (SAR) perspectives. The results show that the 5G base station has a higher exposure than the 3G base station, but the exposure from both base stations is well below the reference levels.

https://ieeexplore.ieee.org/document/9221111/

Citation: Electromagnetic Fields in Cancer Research 1981-1991 (1991-03) Abstract: [PubMed] Abstract: [PubMed] Abstract: [PubMed]