

Position Statement on WiFi Radiation Concerns

Due to recent information in the public media regarding work in a WiFi environment and exposure concerns expressed by University staff and students, the Office of Regulatory Compliance - Environmental Health & Safety, has created this position statement regarding the safety of working in a WiFi environment.

Radiation Emitted by Wireless Networks:

Wireless networks use radio waves to transmit information between wired router stations and the wireless adapter cards in computers/tablets. The radio waves emitted by WiFi networks are typically at frequencies of 2.4 GigaHertz (GHz) or 5.8 GHz - well within that portion of the electromagnetic spectrum defined to be radiofrequency radiation. This radiation is much lower in energy than ionizing radiation (e.g. the type of radiation emitted by x-ray machines), and the biological effects associated with exposure are much different than high energy level radiation.

Potential Hazards of RF radiation:

The adverse biological effect resulting from exposure to high levels of RF radiation is tissue and cell heating. More recently concerns have been raised about whether there may be effects, including carcinogenicity, at RF levels below those levels that produce detectably harmful heating. Many studies have been conducted to determine whether there is a causal relationship between low-level radiofrequency exposure and harmful effects such as cancer and adverse pregnancy outcomes.

Most of the studies conducted to date have been on RF emissions from mobile phones. Due to the close distance between the mobile phone and the head and because of the higher power levels involved with mobile phone use, the level of exposure for frequent mobile phone users is considerably higher than the potential exposure to those persons working in areas in which WiFi systems exist. Epidemiological studies by reputable scientists have consistently failed to demonstrate convincing evidence of any adverse health effects from RF exposure below the regulatory limits and guidelines cited below. The references cited at the end of this discussion provide more detailed information regarding these studies and their conclusions.

Regulations and guidelines:

Exposure limits for radiofrequency radiation have been established by the Federal Communications Commission (FCC), and the Occupational Health & Safety Agency (OSHA). Additionally, the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non Ionizing Radiation Protection (ICNIRP) have established guidelines for exposure to RF radiation.

RF Field Levels due to Wireless Networks:

Various references are available to provide information about surveys of RF field levels associated with wireless networks. For example, a published scientific paper entitled "Radiofrequency Exposure from Wireless LANS Utilizing Wi-Fi Technology" discusses a study in which measurements were conducted at 55 sites in four countries, and measurements were conducted under conditions that would result in the higher end of

exposures from such systems. An excerpt from the abstract states “....In all cases, the measured Wi-Fi signal levels were very far below international exposure limits (IEEE C95.1-2005 and ICNIRP) and in nearly all cases far below other RF signals in the same environments.” Details of this survey can be found in the references at the end of this statement.

Another survey report which provides the results of a survey performed at a school in Australia. The survey included RF field measurements of 22 Wireless Access Points with various transmitted power levels and access mode configurations and in classrooms, meeting rooms and other open areas to measure ambient RF levels in the environment. The Hazard Survey concluded that “All measurements were found to be well below the general public reference level with the maximum reading measured from the wireless network of only 5% of the general public reference level. The maximum environmental reading was 0.0049% of the general public reference levels and the maximum reading when 10 cm from the school notebook computers was only 1% of the general public reference level.” Details of this survey can be found in the references at the end of this statement.

Conclusion and General Recommendations:

It is the general consensus of the scientific community that the level of RF exposure due to wireless networks is so low compared to the many other RF sources in the modern environment that health concerns from WiFi exposure are not an issue. We can reasonably say that the wireless networks present at Northern Arizona University do not present a hazard to persons working or otherwise spending time in University buildings.

References and Resources:

The following references provide additional information regarding the effects and hazards of exposure to RF fields and provide information about RF exposure guidelines, standards, regulations and surveys:

- Foster, KR, Radiofrequency Exposure from Wireless LANS Utilizing Wi-Fi Technology, Health Physics 92: 280-289; 2007.
- Lin, J, [Update of IEEE Radio Frequency Exposure Guidelines](#), IEEE Microwave Magazine; 2006.
- Lin, J, [Safety Standards for Human Exposure to Radio Frequency Radiation and Their Biological Rationale](#), IEEE Microwave Magazine; 2003.
- Osepchuk, JM, and Petersen, RC, [Safety Standards for Exposure to RF Electromagnetic Fields](#), Microwave; 2001
- World Health Organization. [Electromagnetic Fields and Public Health: Base Stations and Wireless Technologies](#). Fact Sheet No. 304; 2006
- Australian Radiation Protection and Nuclear Safety Agency. [Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz](#). Radiation Protection Series Publication No. 3; 2002.

- Australian Radiation Protection and Nuclear Safety Agency. [An Explanatory Question & Answer Guide to the ARPANSA Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz](#). 2002.
- International Commission for Non-Ionizing Radiation Protection. [Epidemiology of Health Effects of Radiofrequency Exposure](#). Environmental Health Perspectives; 2004
- [“RF Hazard Control Document for the Glennie School,”](#) THL Australia, January 2006