Cisco Systems Spread Spectrum Radios and RF Safety

History

Concerns about health effects of cellular phones and wireless LAN radio systems are continuously increasing. Although radio frequency (RF) energy is a form of radiation, the public holds a misconception between the safe and potentially damaging forms. This misconception often raises concerns about possible problems caused by RF devices.

Modern homes and offices are filled with RF producing devices—from computers and fax machines, to cordless phones, pagers, microwave ovens and wireless LAN (WLAN) devices. The level of RF produced by these devices is extremely low.

Today's devices however, operate at higher frequency levels then earlier devices. The higher frequencies produce shorter wavelengths and shorter wavelengths have the potential for greater interaction with the human body tissue. With the increase in frequencies, the potential for interference with medical life support devices also increases.

In the first case, most forms of radio energy pass through the human body without any harmful or residual effects. This is because most energy that is absorbed is extremely low, and has no effect on the human body. The second is now being addressed by makers of medical devices working with the manufacturers of RF devices at places like the University of Oklahoma's Wireless Device Center.

Standards

Researchers have considered the biological effects of RF energy over the past 40 years. Others researching this concern include the Food and Drug Administration (FDA), Federal Communication Commission (FCC), Environmental Protection Agency (EPA), and the Center for the Study of Wireless Electromagnetic Compatibility at the University of Oklahoma. One of their areas of interest is promotion of standards that help assure safe usage of RF energy.

RF experts at the Institute of Electrical and Electronic Engineers (IEEE) have developed a guide for safe usage to prevent harmful effects of RF energy. The American National Standards Institute (ANSI) under publication C-95.1 - 1991 publishes this guide, which covers non-ionizing RF energy.

As of January 1, 1997, RF devices from amateur radio stations, cellular phones, Spread Spectrum data radios, and other RF devices are required to meet the RF safety limits set forth by the FCC in Docket 96-362 (NPRM 93-62). This OET Bulletin number 65 is entitled Evaluating Compliance with the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

Cisco Systems Compliance

All Cisco radio-based products comply with both the ANSI C95.1-1991 IEEE Standards for Safety Levels with Respect to Human Exposure as well as the FCC Office of Engineering and Technology Bulletin 65 Evaluating Compliance with the FCC Guidelines for Human Exposure. Cisco radios are evaluated for RF Safety Compliance per the requirements of FCC Part 2.1091 and 2.1093 of the FCC rules as well as RSS-102 requirements from Industry Canada. The compliance is based on the results of the Maximum Permissible Exposure Studies for mobile or fixed devices and per Specific Absorption Rate Tests for portable devices.

By definition, portable devices are devices that are designed to operate with the antenna less than 20cm from the user or bystander. An example would be a radio installed in a Palmtop device, which could be belt worn and used or some laptop installations. Mobile and fixed devices are designed to be used at distances greater than 20 cm from the user. This includes systems mounted in desktops, ceiling mounted systems, or systems with the antenna mounted on the roof or tower.

Before approval by the FCC or Industry Canada can be issued, we are required to either submit a MPE study for the devices that fall under the mobile or fixed category and SAR study or test results for devices that are installed in portable devices. When the devices are installed and operated with in the parameters set forth in the instruction manual, the user or general public will not be subjected to any levels of RF greater than the recommended standards.

For portable devices, the spread spectrum radios operate at one-tenth of the recommend exposure requirements for this type of device.

Cisco systems are also designed to reduce emissions that can interfere with medical devices. Cisco products such as the various spread spectrum radio meet both the FCC and European emission levels required for devices operating in medical environment specifically EN 55011 emission standards.

In September, 1996, an independent test was conducted by a hospital before the installation of Cisco Spread Spectrum Systems. The results showed that the Cisco Systems 2.4 GHz radios did not interfere or degrade the performance of heart pacemakers when operated at close proximity to such a device.

The various Cisco radio products do not produce any harmful ionization. The bottom line is that Cisco Systems products are safe, provided that they are not used in a manner inconsistent with intended use.

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