

Table 1. Frequency bands and typical output power for wireless communication systems.

System Location	Frequency Bands (MHz)	Maximum Power Output (mW)
Asia	810-935	600
	1895-1910	10
Europe	890-960	1000
	1710-1880	25
North America	824-849	600 - 1000
	1850-2200	10 - 25

ANSI/IEEE EXPOSURE STANDARD FOR RADIO FREQUENCY FIELDS

In 1966, the United States of America Standards Association, the current American National Standards Institute (ANSI), promulgated an exposure standard for control of radio frequency radiation for health and safety in the West. Since then continued research has produced a large literature base that was used by several national and international organizations to develop safety standards and exposure guidelines. This discussion will cover only the ANSI/IEEE C95.1-1992 standard. It includes updates from its 1982 predecessor. It also incorporated into it several recommendations from the National Council on Radiation Protection and Measurements (NCRP), in particular, its report on biological effects and exposure criteria for radio frequency electromagnetic fields [NCRP 1986].

The ANSI/IEEE C95.1-1992 standard for safe human exposure to radio frequency fields provides guidelines for maximum permissible exposure limits. In the frequency range of wireless communication, the metric is derived from the specific absorption rate (SAR) in tissue and the incident power density that causes it. The values adopted for the SAR's are 0.4 W/kg averaged over the entire body or 8.0 W/kg for any one gram of tissue. Note that these values are reduced by a factor of five for the uncontrolled environment (See **Table 2**). At frequencies between 800 and 2200 MHz, the maximum permissible exposures are $f/300$ and $f/1500$, respectively for controlled and uncontrolled environments (The frequency is expressed in MHz). At a frequency of 800 MHz, the standard recommends that the human exposure be limited to 2.7 mW/cm² as averaged over 6-min period for the user and 0.53 mW/cm² as averaged over 30 min for the situation where the user does not have control of the radio frequency source. At a frequency of 2200 MHz, human exposure is limited to 7.3 mW/cm² as averaged over 6 min and 1.47 mW/cm² as averaged over 30 min, respectively, for controlled and uncontrolled environments.

The maximum permissible exposure at frequencies between 450 and 1500 MHz may be exceeded if the radiated power is $7(450/f)$ W or less for controlled environments and, $1.4(450/f)$