

Study of temporal variation of radiofrequency electromagnetic radiation levels in two bedrooms in urban and rural locations in Sri Lanka - a case study

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Nowadays, most people panic with sleeping disorders, and different causes are emerging day-to-day. Some scientists believe that living inside environments with high Radiofrequency (RF) intensities and keeping mobile phones in the bed may lead to sleeping disorders and may change the behavior of the nerve system. In this study, Radiofrequency radiation is measured within the frequency range 300 MHz – 3000 MHz in two bedrooms inside the houses located in Colombo (Urban Location) and Kegalle (Rural Location) districts, respectively. The reason for selecting the above frequency range is most of the television broadcasting, cellular communication, Wi-Fi, and other data communication networks use this frequency range. At the selected locations, RF plane wave power densities and the electric field intensities were recorded using the Spectran HF6065 spectrum analyzer on an hourly basis for a duration of 12 hours. Measured values were compared with the international reference levels published by ICNIRP (International Commission on Non-Ionizing Radiation Protection) and FCC (Federal Communications Commission). Maximum plane wave power density and electric field strength measured in the urban location are $38.08 \pm 0.01 \mu\text{W m}^{-2}$ (0.0005% of the maximum permissible level) and $119.80 \pm 0.01 \text{ mV m}^{-1}$ (0.23% of the maximum permissible level), respectively. The maximum RF radiation levels were observed at 4 a.m. at the urban location and at 6 a.m. at the rural location. According to the results, recorded RF radiation values are shifted towards 2 GHz frequency region in the urban location, and at the rural location, those are gathered around 1.1 GHz region. It is found that the urban location is nearly 10 times polluted by RF radiation than the rural location, and still, these values are well below the maximum permissible levels. Further studies are underway to observe high RF polluted locations and their effects.

Keywords: Radiofrequency, Electromagnetic pollution, sleeping disorders, nerve system.