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A case study on the increase of RF levels in the proximity of a mobile phone when making and receiving a call

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Currently, people spend most of their time with mobile phones due to the pandemic situation; specially, children use mobile phones to continue their studies. Staying close to mobile devices, which use radiofrequency electromagnetic radiation (RF-EMR) may cause serious health issues, especially for children and pregnant women because they are more susceptible to this radiation. Some studies show that RF-EMR can induce changes in the central nervous system and exposure to the EMR emitted by cell phones can cause behavioural difficulties in children such as emotional and hypersensitivity problems. In this study, increase of the RF levels were investigated near a mobile phone in sleep mode, while a call is being received and while a call is taken. The selected mobile phone is placed at a location having poor signal reception (only one bar) and SLT Mobitel was selected as the network carrier within GSM900/GSM1800 network bands. The reason for selecting poor signal reception is that at this level, the mobile phones emit maximum RF radiation. The data were collected at four distances from the mobile phone display and for each location ten root mean square (RMS) electric field strengths were measured by using Spectran HF6065 spectrum analyzer and specific absorption rate (SAR) values for the human brain were calculated based on the measured electric field values. Comparisons were made for the measured and calculated values using international reference levels published by International Commission on Non-Ionizing Radiation Protection (ICNIRP). According to the results, 0.150 ± 0.001 V/m was the highest average electric field strength observed and it was detected when receiving a call. Reason for obtaining highest electric field strength when receiving a call could be because the receiving antenna is located closer to the display of the selected mobile phone. The maximum increase of the electric field strength is 782.3% compared to the background average electric field strength (0.017 ± 0.001 V/m). However, the measured maximum electric field strength is 0.36% of the maximum permissible value (41.25 V/m) for general public and the calculated maximum SAR for the human brain for the above maximum electric field strength is 1.68×10^{-5} W/kg, and it is 0.00084% of the maximum permissible value (2 W/kg) for the general public. Further studies are underway to study possible health risks related to cell towers and cell phones.

Keywords: Mobile phones, radiofrequency electromagnetic radiation, health issues

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