Enclosure Effects on SAR Estimation of Homogenous Human Head model with IFA

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This paper intends to reflect a novel approach to investigate the effects of enclosures on SAR estimation with Human body for Inverted F Antenna. A pragmatic approach is implied to determine and analyze the effects of radio frequency on human exposure. Mobile antenna such as Inverted F antenna (IFA) are predominantly used for GSM frequencies such as 900MHz and 1800 MHz. The performance of IFA is estimated based on it return loss and S_{11} parameter is calculated at its operating frequency. Further a spherical Homogeneous model depicting a size of a Human Head is designed with the dielectric tissue property and conductivity for 900MHz and 1800 MHz. The designed IFA is simulated in a free space condition and the EM interaction is studied. Enclosure analysis is done by introducing Cylindrical and Rectangular structures and its impact on SAR computation is studied. Metallic enclosures have resonance and reflection effects, thereby increasing electric field strength and resulting in change in levels of human exposure to Electromagnetic absorptions. So this work examines and compares the impact levels of absorption in terms of SAR values under various conditions. The results show that SAR computation and its value seems to be massively increased in structures used as enclosures and is compared with free space. The method of computation methodology is Method of Moments and FEKO software is used for implementation.