Performance of Electrically Coupled Loop Antenna inside human body at different frequency bands

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Abstract:

Recently there has been a growing interest in the design of implanted antennas for biotelemetry, e-healthcare, and hyperthermia applications. The implanted antenna needs to be extremely small while maintaining a low Specific Absorption Rate (SAR). Most of the proposed antennas for implanted applications are electric field antenna such as Planner Inverted-F Antenna (PIFA). These types of antennas have high near zone electric field intensity and high SAR value. In this work, an Electrically Coupled Loop Antenna (ECLA) is proposed as a magnetic loop antenna, which has a relatively low near zone electric field intensity and therefore, small SAR values. An ECLA is designed in the Medical Implanted Communication Services (MICS) band (402-405 MHz), Industrial Scientific and Medical (ISM) band (2.4-2.5 GHz), and Ultra Wide Band (UWB) communication band (3.5-3.6 GHz) with dimensions (5×5×3mm3), (3×3×3 mm3), and (2×2×2 mm3) respectively. Using High Frequency Structure Simulation (HFSS), the performance of ECLA inside one-layer human body model will be analyzed at three frequency bands.

Published In:

Antennas and Propagation Society International Symposium (APSURSI), , NULL , 975-976