

PERFORMANCE OF A SMALL HELICAL DIPOLE ANTENNA FOR UHF BAND COMMUNICATIONS

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ABSTRACT: Currently, implanted medical devices, which use inductive coupling for communication, cannot be guaranteed for transmitting medical data in several meters range. This triggers several studies about implantable device systems to enable longer communication range by using electromagnetic transmission. This system utilizes the external devices such as home monitoring device or portable equipment that will provide more mobility for patient, more effective time consume and easier to access the essential patient medical information via the available networks. Due to those advantages, implantable devices are very essential components in monitoring systems. In order the implantable device can wirelessly communicate with an access point, a small antenna is required. This paper proposes an implanted helical dipole antenna for an implantable device in wireless patient monitoring applications. The design is considered that by only using a syringe the device can be embedded into the human body for simplicity purpose. The antenna is intended to be operated in UHF band 924 MHz when it is implanted in the body. However, the antenna performance in free space is also required to be validated since when the antenna is implanted into the tissue medium, the frequency characteristics will change dramatically. Hence, in this paper, the measured antenna performance in free space environment is discussed, such as S parameter, input impedance, bandwidth, and radiation pattern. The antenna dimension is 25 mm in length and 2 mm in diameter at frequency 2.259 GHz as predicted in simulation results. The measured radiation pattern is also suited the simulation results. Therefore, the antenna is ready to be used for validation measurement in imitated-tissue model (i.e. phantom).