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An experimental study of UHF-RFID using passive backscatter modulation for brain computer interface (BCI) applications

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Brain computer interfaces uses the electrical activity of the brain to enable communication in patients with severe motor disabilities. The goal of a BCI system is to bypass the damaged nervous system and establish a communication between brain and the affected limb. One of the major challenges of a BCI system is transmission of ECoG signals from the brain to the affected limb. Current BCI technology uses wires to connect the electrodes and the transmitters in invasive systems. A low power, low interference wireless system is vital to achieve a fully implantable BCI. This paper discusses an implantable, low power wireless RFID transmitter which operates in the UHF range to compliment a BCI system. The performance of the RFID transmitter is experimentally tested on chemicals that replicate dielectric properties of the human brain. The results demonstrated the properties such as received signal strength, signal to noise ratio and channel capacity for various implant depths.