**Anchor-Shaped Antenna-Based Wireless Charging Platform for Internet of Things**

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The demand for smart electronics has been exponentially increased over the past decades. Their applications include healthcare, sport/fitness, childcare, military, home security, and space. The criteria put forth to develop these devices go beyond their functionality. They need to be fully flexible, cost-efficient, easy to fabricate, and resilient to mechanical deformations. In addition to these criteria, they need to be battery-less in a way to work like standalone systems. Once these requirements are met, they can be used for integration into items of clothing and upholstery for wearable applications.

With that in mind, we propose a system with wireless power transfer and harvesting modalities. The system uses a novel anchor-shaped antenna that encompasses the characteristics of both dipole and loop antennas. The development of the system is controlled/optimized to realize (1) comfortability, (2) light weight, and (3) resilience to many cycles of bending, twisting, folding, wrinkling, washing, and drying. The system operates at 360 MHz and features a rectifying circuit resonating at the same frequency for RF power conversion into DC. The simulated and measured power transfer efficiency (PTE) of the system was found to be 85%, 70%, and 60% when it was subject to lateral, elevational, and azimuthal misalignments, respectively. The lateral misalignment was performed for up to 10 cm and the angular misalignments, up to $180^0$ between the transmitter and receiver. Further, the DC power collection was found to be between 2 and 10 mW for all misalignment cases within 4 ft. This DC power level is enough to drive a wide range of low-power sensors and other IoT devices. Notably, the performance of the system was optimized by using tightly controlled embroidery of highly conductive threads onto fabric substrates. At the conference, we will present examples of antennas and rectifying circuits developed on textile/fabric substrates. Analysis, simulation, and measurement results will be presented for the developed prototypes.