Researchers at the University of South Florida have developed a radio-frequency identification (RFID) tag antenna to provide the highest gain possible to improve the read range.

Many new RFID applications have been introduced into the market in recent years. Naturally, all such applications would benefit from RFID tags that are smaller, lighter, and have greater read range. Although studies have been conducted that have focused on improving the performance of planar antennas, high-frequency antennas have been successfully fabricated using three-dimensional fabrication techniques, such as additive manufacturing. These antennas have been fabricated using thermoplastics having a low loss tangent as compared to commercially available substrates. Such materials can be printed in a conformal manner and used to form non-planar three-dimensional printed devices. In view of the availability of three-dimensional fabrication techniques, it would be desirable to fabricate RFID tag antennas using these techniques in order to obtain improved results in terms of one or more of cost, size, weight, and read distance.

Researchers at USF have developed a novel RFID tag antenna geometry for UHF Radio frequency identification systems using 3D printing. The antennas were compared to commercially available tags in size, weight, and read distance, showing a read range improvement of 136% (for a threshold power of 30 dBm) with respect to the best tag tested. A reduction in length of 78% with respect to a planar 2D model was also achieved. The radiation patterns were measured, showing an omni-directional beam pattern. Hence, this technology proves to be effective in terms of cost, size, weight and read distance.

**ADVANTAGES:**
- Improved reading range
- Reduced size compared to commercially available RFID tag antennas
- Low cost solution

**Tech ID # 15A062**

**Patent #: 10,038,248**