Researchers at the University of South Florida have invented ultra high frequency (UHF) radio frequency identification (RFID) tags using additive manufacturing for both on- and off-metal applications.

RFID has been introduced as a means of solving both the identification and tracking requirements. RFID applications and uses continue to increase in number prompting new, innovative tag designs. A typical RFID tagging system involves a tag and a reader. The RFID tag is a device that contains a small, inexpensive, programmable memory chip and a transponder unit. When scanned by a reader, the antenna within the tag picks up the radio wave and sends a response back. Most commercial tag designs currently available are optimized for either on-metal or off-metal conditions, and the performance greatly degrades when the surrounding environment differs from the intended one. It would be desirable to have a single RFID tag which is robust enough to perform well under either scenario.

Our researchers have created RFID tags for dual band operation (ISM RFID UHF 864-868 MHz and 902-928 MHz) which can be used for both on- and off-metal applications. The impedance matching to the RFID chip is achieved using two parallel stubs enabling the tags to work in UHF. Additionally, meshed ground designs are used to reduce materials and printing time while having a minimal effect on read range. RFID tags can be used in applications like access management, tracking of goods, tracking of persons and animals, toll collection, contactless payment, and many more.

**ADVANTAGES:**

- Operates in both on-metal and off-metal conditions
- Dual band operation (ISM RFID UHF 864-868 MHz and 902-928 MHz)
- More compact design

**Meshed Configuration RFID Tags**

**Mechanism of Radio Frequency Identification**