National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Passive Chipless RFID Sensor Tags for Intelligent Packaging
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Venue	: Seminar Hall (EC-303)
Date and Time	: 17 May 2024 (11 am)
Abstract	: The chipless Radio Frequency Identification (RFID) is one of the fastest-developing technologies for object identification, tracking, packaging, and sensing due to its low cost, planar structure, and ease of the manufacturing process. The recent advancements in chipless RFID technology include the incorporation of sensor functionalities into tags. Transitions in environmental parameters such as temperature, pressure, strain, moisture, and gas can be monitored using chipless RFID tags with proper setup and sensing materials. The main objective of this Ph.D. research work is to develop RFID sensor tags and reader antenna for intelligent packaging, which monitors the environmental conditions of packaged products. Initially a concentric ring-based multi-bit tag is designed to improve its code density. The code density is improved by due to the inclusion of more resonators on both sides of the substrate. If tag is not orientation independent and flexible, then its improper orientation and bending cause fluctuations in response. To reduce redundant fluctuations, circular resonator is chosen and different flexible substrates are used to study the effect of bending of tags. It is observed that polyethylene terephthalate (PET) and Kapton flexible materials are less affected due to different bending styles. Further, the concentric ring-based multi-bit orientation-insensitive tag designed on PET substrate is proposed for both identification and sensing. Subsequently, an X-shaped orientation-insensitive tag is designed on a 0.5 mm thin PET flexible substrate. The proposed tags are designed for the humidity and temperature monitoring. The simulated results show that the sensor tags are orientation-insensitive and provide humidity/temperature sensing.