

## **Title: Performance evaluation of ring structure implantable antenna using glass encapsulation**

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### **Abstract**

Recent progress in the field of wireless technologies, particularly in RFID technologies have enabled significant and continuously evolving advancements towards a wide array of products and concepts that are being utilized in various applications. RFID technology has been prominent in advancements related to applications in monitoring, logistics, identification and in recent times, sensing and bio implantable based tag antenna designs. In this study, we aim to evaluate an extremely small ring antenna structure, which is an RFID transponder with a reduced size of  $\pi \times (3 \times 5) \times 1 \text{ mm}^3$ , which was in a previous study was coated in silicone and was utilized for the development of a brain-implantable antenna and sensor platform. It was tested in a liquid phantom simulating a brain environment and then eventually tested in mice, which resulted in a read range of about 1 m, with similar results in simulated and real time measurements.

In this study, we aim to implement the above-mentioned antenna structure using a glass encapsulation for both the silicone coated structure and without the silicone coating. The glass structure that is considered will be implemented using hermetic glass packaging method and the performance of the ring antenna structure will be evaluated, and comparisons between the two types of glass encapsulated ring antennas will also be conducted, including the ease of implementation, and the overall evaluation of the performance of the ring antenna structure.