

# Wideband Implantable Antenna for Leadless Cardiac Pacemaker

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## Motivation

- Reduced complications in implantation
- Improved patient monitoring
- Patient comfort

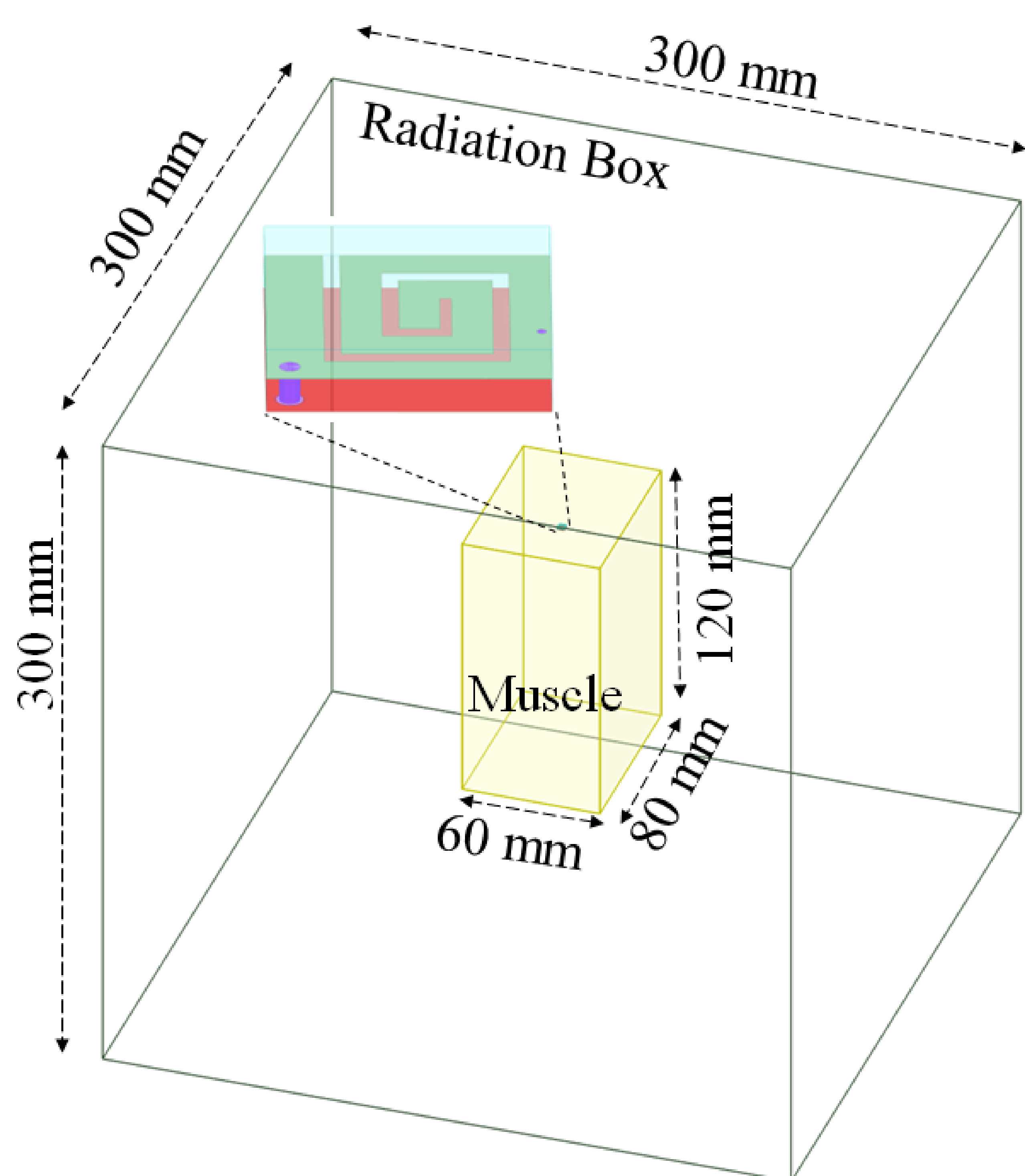
## Objectives

- **Enhanced Bandwidth:** improve the bandwidth of the system for greater data rates and to allow for varied detuning in implantation.
- **Compact Size:** miniaturise design to fit a leadless cardiac pacemaker (LCP) system.

## Contribution

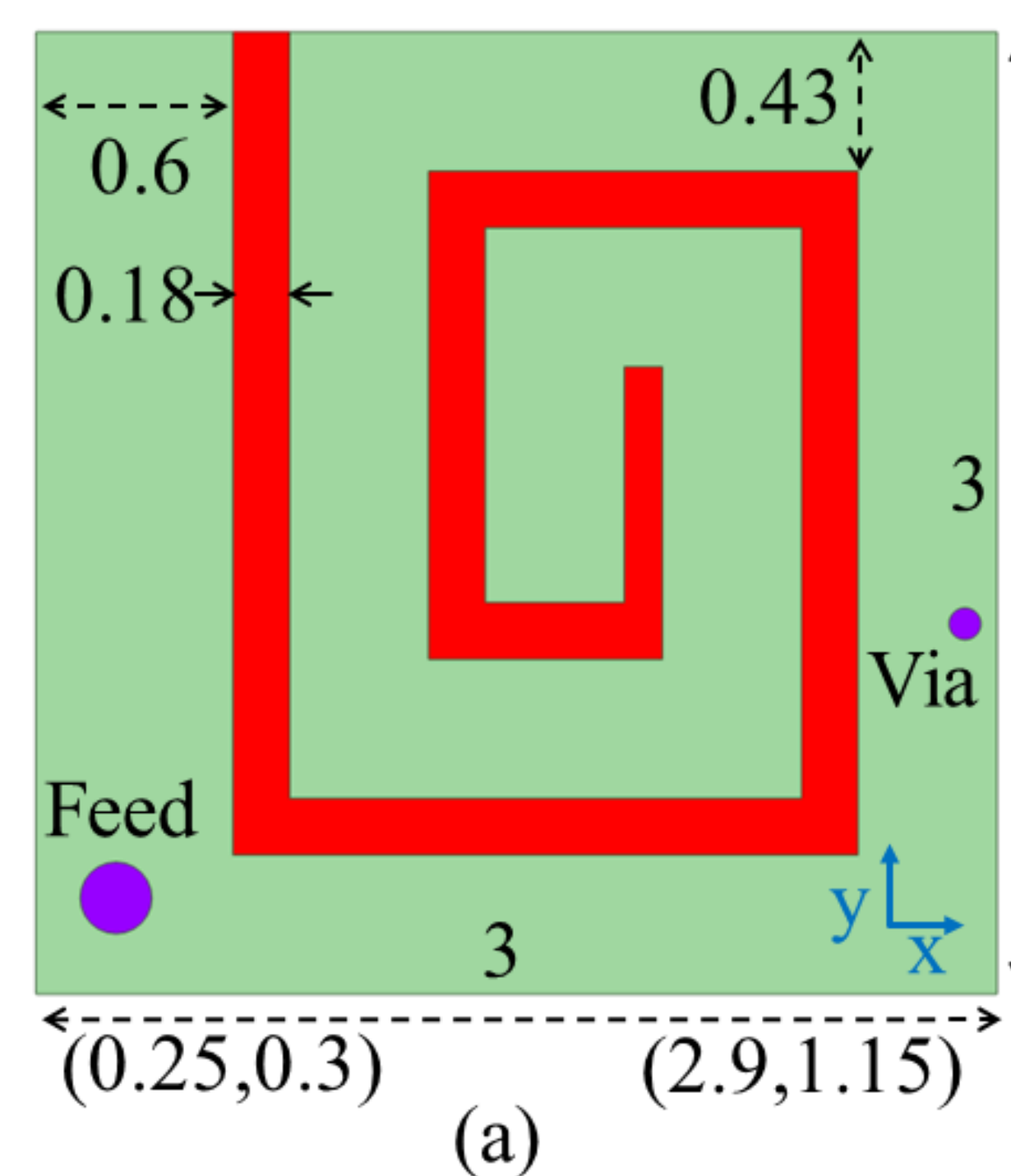
- Implementing a shorting pin for improved bandwidth and miniaturisation.

## Simulation Setup

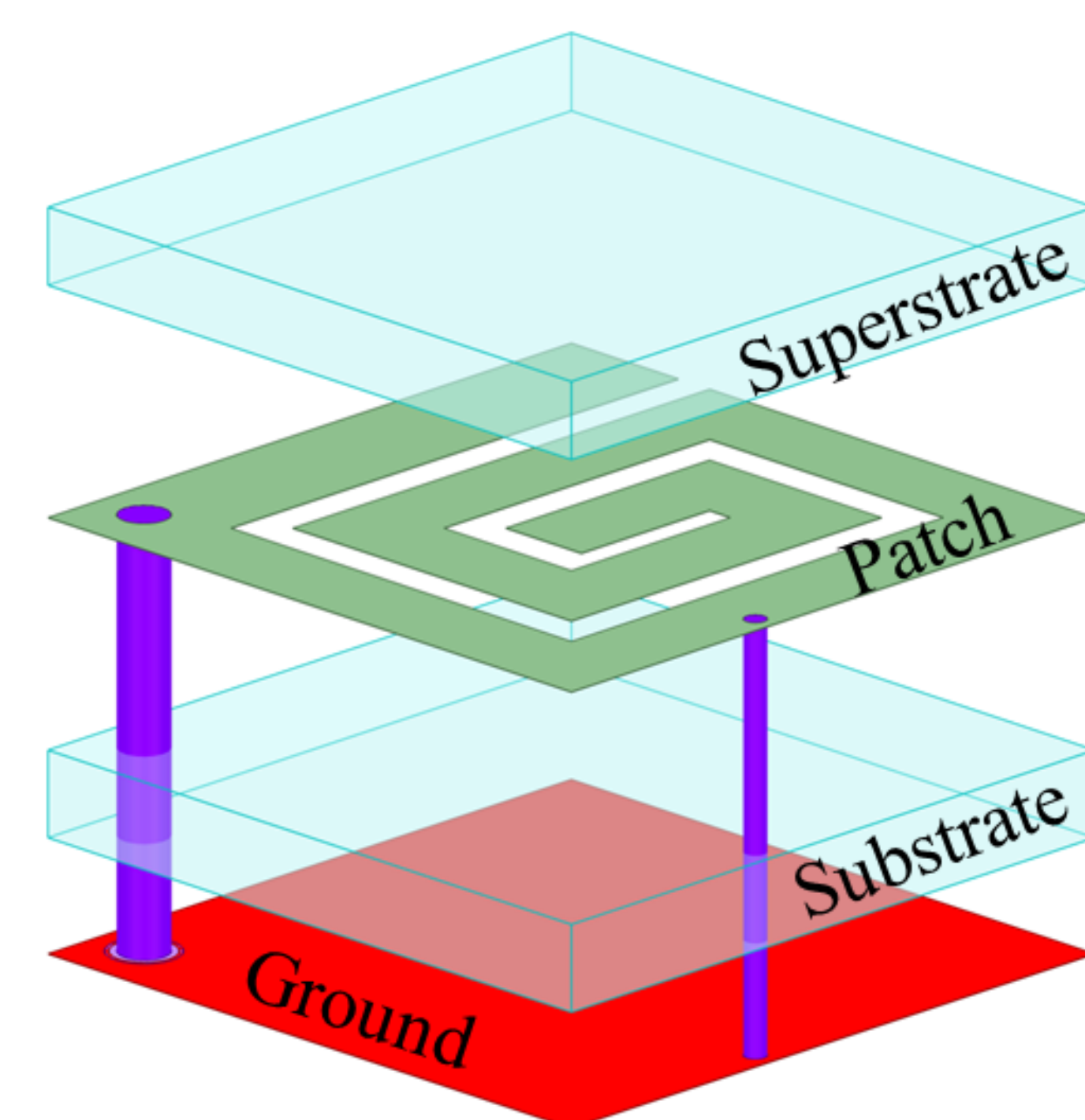


The proposed antenna has been simulated in a homogeneous heart phantom.

## Proposed Antenna Dimensions



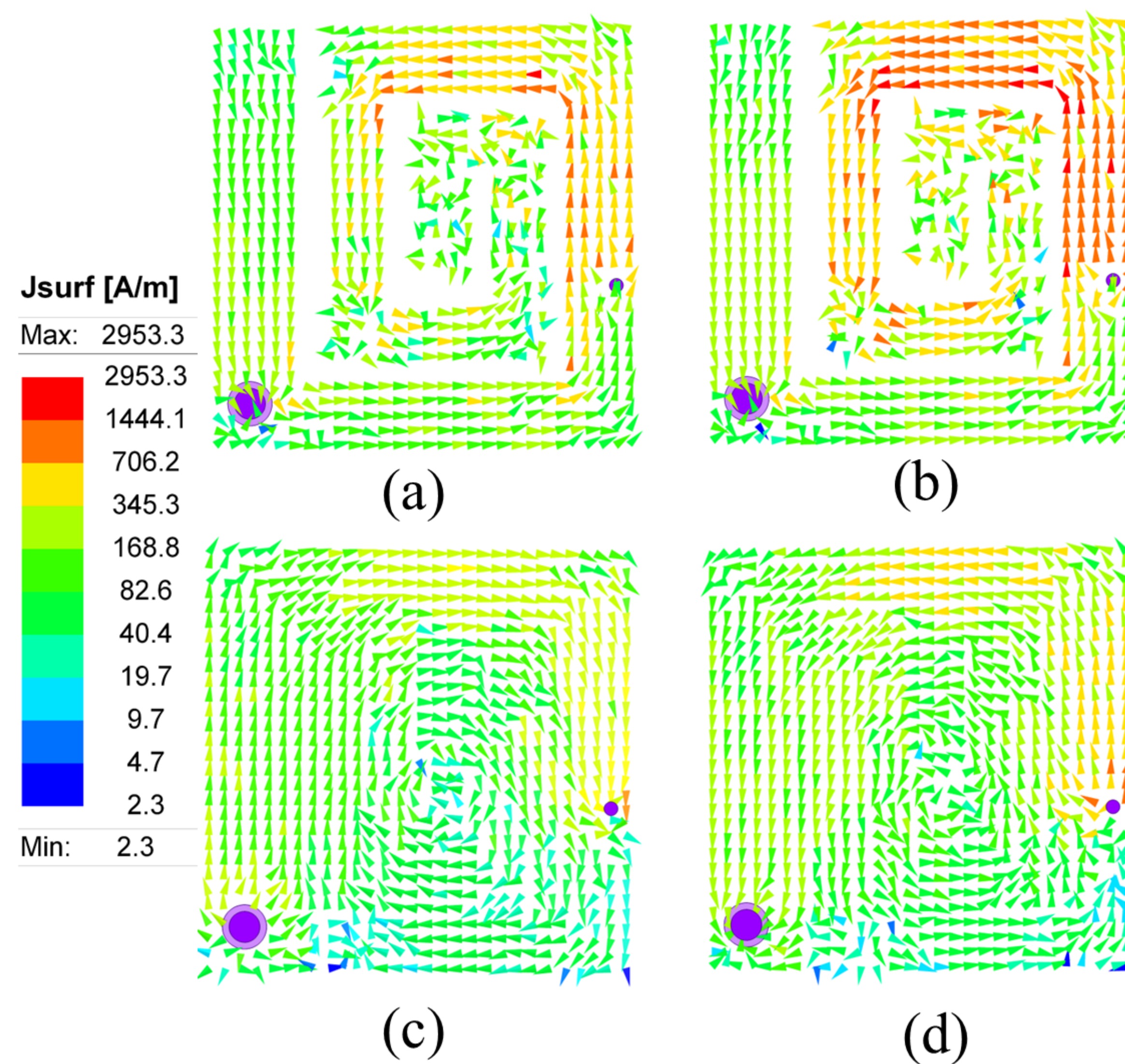
Superstrate	0.335
Substrate	0.375



(a)

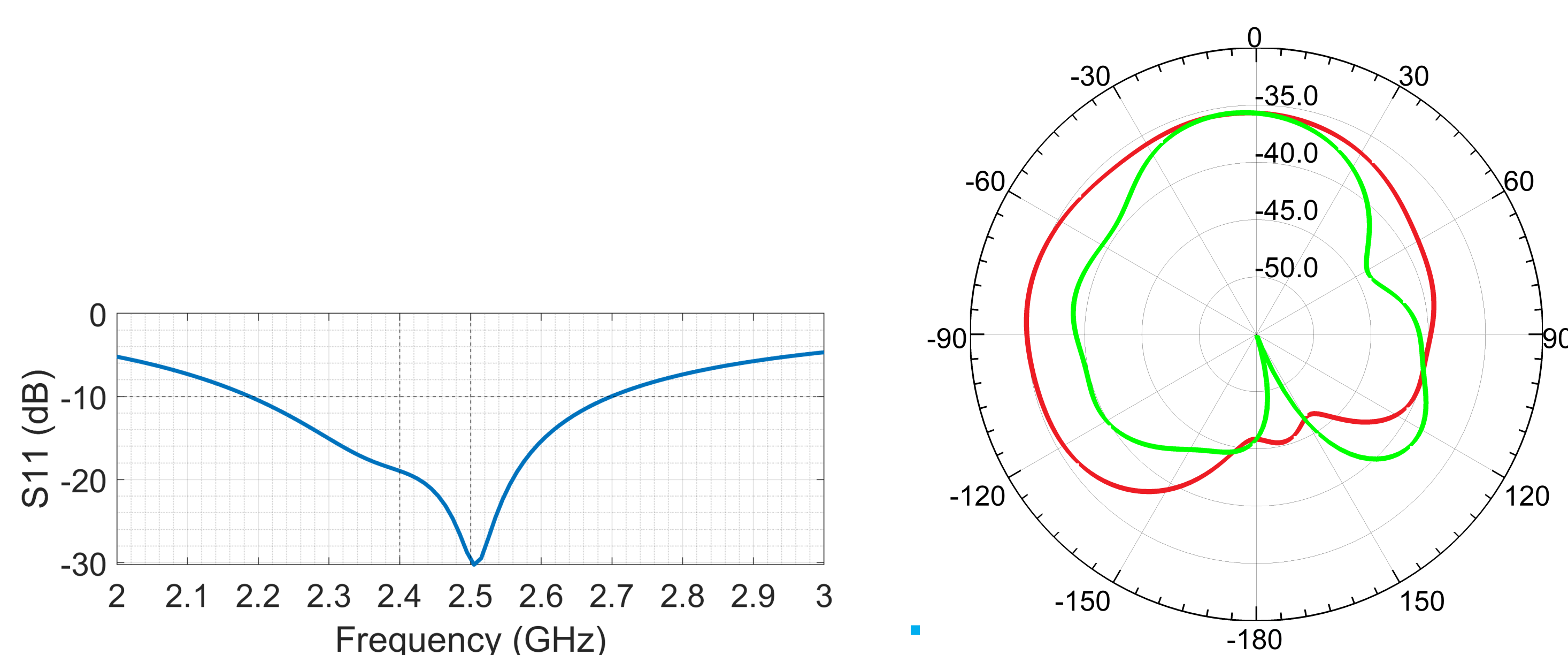
(c)

## Current Distribution



The antenna achieves its widened bandwidth via the alternative path offered by the shorting pin. (current at 2.3 GHz and 2.5 GHz)

## S-11 and Radiation Pattern



## Conclusion

- The proposed antenna is close to the dimensions of the smallest proposed implantable antennas for LCPs in the literature ( $3 \times 3 \times 0.71 \text{ mm}^2$ ) while attaining an improved simulated fractional bandwidth of 20.0%.
- Miniaturisation is achieved through a shorting pin and spiral meander pattern.
- Poster presented at URSI UK Symposium 2024
- Accepted to present at IEEE Antennas and Propagation Society International Symposium (AP-S/URSI 2024): Interactive Forum

## ACKNOWLEDGEMENT

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