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A Compact Size Capacitive Load Dual Band Planar Inverted-F Implant Antenna for Biomedical Services

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Abstract

In this work a compact size capacitive load dual band planar inverted-F implant antenna is presented. The suggested antenna is modeled on RO3010 substrate that has a thickness of 2 mm, dielectric constant of 10.2, and tangent loss of 0.0023 to operate at both the Medical Implant Communications Services (MICS) and Industrial, Scientific, and Medical (ISM) bands. A capacitive load is inserted between the patch and the ground plane to get a dual band and compact size implant antenna. The idea behind the capacitive load is to support a simple structure with a dual band and compact size in addition to get a gain enhancement. The antenna size is $20 \times 12 \times 2$ mm^3. The antenna designed in this work operates at 402 MHz with a return loss of – 23.23 dB over a

frequency band [397.15–409.4 MHz] for MICS band and operates at 2.42 GHz with a return loss of – 20 dB over a frequency band [2.37–3 GHz] for ISM band. The simulated gain is – 27.52dBi at 402 MHz for MICS band and – 1.85dBi at 2.42 GHz for ISM band. The proposed antenna has a good performance inside three-layered tissue model. The Computer Simulation Technologies (CST) Microwave studio is used to model and simulate the proposed antenna.

Data and material availability

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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Ethics declarations

Conflicts of Interest

Authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding.

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