|  |  |  |  |
| --- | --- | --- | --- |
| **Title:** | Tungsten disulfide based wearable antenna in terahertz band for sixth generation applications | | |
| **Author(s) Name:** | Avijit Roy, Md. Razim Bhuiyan, Md. Ariful Islam, Pahil Saha, Sumit Hassan Eshan, Raja Rashidul Hasan, Rinku Basak | | |
| **Contact Email(s):** | hemal@aiub.edu | | |
| **Published Journal Name:** | TELKOMNIKA Telecommunication Computing Electronics and Control | | |
| **Type of Publication:** | Journal | | |
| **Volume:** | 22 | Issue | 3 |
| **Publisher:** | NA | | |
| **Publication Date:** | June 2024 | | |
| **ISSN:** | 1693-6930 | | |
| **DOI:** | http://doi.org/10.12928/telkomnika.v22i3.25845 | | |
| **URL:** | http://telkomnika.uad.ac.id/index.php/TELKOMNIKA/index | | |
| **Other Related Info.:** | Page 545-555 | | |
|  | | | |

|  |  |
| --- | --- |
| **Abstract:** |  |
| This paper is an extension of work originally presented in 2019 International Conference  on Automation, Computational and Technology Management (ICACTM). A micro-strip  patch in-body designed antenna is constructed on pacemaker to monitor and control the  pacemaker wirelessly. The antenna is intended for ISM (Industrial, Scientific, and Medical)  band (2.4 GHz to 2.48 GHz). A perfect electric conductor (PEC) is considered as  pacemaker body and used as the ground of the propounded antenna having dimensions 40  x 30 x 10 mm3. The patch material is chosen Copper having dimensions 35 x 22 x 0.1 mm3  and covered up with substrate material Rogers R03010 (loss tangent δ = 0.0035 and  dielectric constant, r = 10.2) with thickness of 1.55 mm to make it compatible in human  body. The designed antenna is placed and analyzed in 2/3 muscle equivalent phantom by  changing the depth of the antenna. Results disclose that operating frequency is 2.464 GHz  with reflection coefficient -28.37 dB. The antenna maintains frequency range from 1.8075  GHz to 3.445 GHz, which represents wide bandwidth of 1.6375 GHz. To ensure the human  body safety, specific absorption rate is analyzed and found 0.937 W/Kg for 10g tissue at  operating frequency, which makes it biocompatible. The surface current distribution,  Voltage Standing Wave Ratio, Current density, far-field radiation characteristics, radiation  efficiency, and total efficiency are investigated to analyze the effect and performance of the  designed antenna. CST Microwave Studio is used for simulation and analysis the  parameters of the antenna. | |