|  |  |  |  |
| --- | --- | --- | --- |
| **Title:** | Performance Analysis of Microstrip Patch Antenna for the Diagnosis of Brain Cancer & Tumor using the Fifth-Generation Frequency Band | | |
| **Author(s) Name:** | Sayed Abdul Kadir Al-Nahiun; Fardeen Mahbub; Rashedul Islam; Shouherdho Banerjee Akash; Raja Rashidul Hasan; Md. Abdur Rahman | | |
| **Contact Email(s):** | hemal@aiub.edu | | |
| **Published Conference Name:** | 2021 IEEE International IOT, Electronics and Mechatronics Conference (IEMTRONICS) | | |
| **Type of Publication:** | Conference | | |
| **Volume:** | NA | Issue | NA |
| **Publisher:** | NA | | |
| **Publication Date:** | May 2021 | | |
| **ISSN:** | NA | | |
| **DOI:** | 10.1109/IEMTRONICS52119.2021.9422503 | | |
| **URL:** | https://ieeexplore.ieee.org/document/9422503 | | |
| **Other Related Info.:** | NA | | |
|  | | | |

|  |  |
| --- | --- |
| **Abstract:** |  |
| Brain Cancer and Tumors are common death factors over the world. Determining the location of a brain tumor at an early stage is difficult due to its minimal size and some disadvantages of the mechanisms used for the diagnosis of the brain tumor. In this paper, a Rectangular Microstrip Patch Antenna has been designed for Microwave Imaging (MI) with a frequency range of 1.5 GHz to 3 GHz at a resonant frequency of 2.3 GHz (5G-Band) in the CST Studio Suite Software to identify brain tumors. FR-4 Substrate material has been used to design the Antenna. The Antenna dimension that has been designed in this paper is 60.46\*78.73\*1.7 mm 3 and the radiating patch of the Antenna was fed by a feedline, which is rectangular in size. The human brain phantom has been created in the CST software with six different homogenous layers of skin, fat, skull, dura, CSF (Cerebrospinal Fluid), and the Brain. Besides, a 5mm tumor was also placed inside that human brain. The Antenna was applied in the brain phantom both with and without the tumor to analyze the Antenna's performance. A Reflection Factor (S 1,1 ) of -30.76 dB and -30.88 dB were also achieved respectively after applying the Antenna in the brain phantom with and without the tumor. Other obtained performance parameter values were also provided in this paper, such as Directivity (2D & 3D), Radiation Efficiency, Polar Radiation, Specific Absorption Radiation (SAR), etc. the Antenna will be a safer choice for the detection of brain tumor. 5G frequency band has been used here because the free space antenna can be used in communication (5G mobile communication, WLAN, Wi-Fi), and as well as for body applications. | |