(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :07/03/2024

(21) Application No.202441016064 A
(43) Publication Date : 22/03/2024

(54) Title of the invention : A NOVEL DESIGN OF SQUARE MICROSTRIP PATCH E-SLOTTED ANTENNA AT 28GHZ FOR 5G APPLICATION

(51) International classification	:H01Q0009040000, H01Q0001380000, H01Q0001220000, H01L0023660000, H01Q0021290000
(86) International Application No Filing Date	:NA :NA
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

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(57) Abstract :
The research presented herein provides a comprehensive analysis of a square patch antenna featuring an E slot design tailored specifically for 5G wireless communication applications. This study meticulously explores the utilization of bandwidth in facilitating effective communication within the 5G spectrum. The suggested antenna design showcases the implementation of the microstrip feeding technique, a pivotal aspect of its operational framework. Within the scope of this investigation, an array of performance parameters including antenna bandwidth, return loss, gain, voltage standing wave ratio, efficiency, and directivity are meticulously evaluated and documented. The proposed antenna configuration is characterized by a dielectric constant of 2.2, strategically chosen to optimize its performance within the intended frequency range. Operating at a frequency of 28GHz, the antenna design is meticulously engineered utilizing an RT Duroid substrate 5880, distinguished by a height dimension of 1.5 mm. Noteworthy is the considerable bandwidth of 5.11 GHz exhibited by the proposed antenna, underscoring its efficiency in facilitating robust communication within the 5G domain. Through comparative analysis, the study highlights the superior performance of the proposed square patch antenna when juxtaposed against prevailing methodologies. Simulation activities integral to this study are conducted utilizing CST software, ensuring a rigorous evaluation and validation of the proposed design's effectiveness. By elucidating the comparative advantages and enhanced performance metrics of the proposed antenna configuration, this research endeavor contributes significantly to the advancement of 5G wireless communication technologies.

No. of Pages : 17 No. of Claims : 2