World Academy of Science, Engineering and Technology
International Journal of Electronics and Communication Engineering
Vol:17, No:07, 2023

Design, Modeling and Analysis of 2×2 Microstrip Patch Antenna Array System for 5G Applications

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Abstract : In this work, the mathematical modeling, design and analysis of a 2×2 microstrip patch antenna array (MSPA) antenna configuration is presented. Array utilizes a tiny strip antenna module with two vertical slots for 5G applications at an operating frequency of 5.3 GHz. The proposed array of antennas where the phased array antenna systems (PAAS) are used ubiquitously everywhere, from defense radar applications to commercial applications like 5G/6G. Microstrip patch antennae with slot arrays for linear polarisation parallel and perpendicular to the axis, respectively, are fed through transverse slots in the side wall of the circular waveguide and fed through longitudinal slots in the small wall of the rectangular waveguide. The microstrip patch antenna is developed using Ansys HFSS (High-Frequency Structure Simulator), this simulation tool. The maximum gain of 6.14 dB is achieved at 5.3 GHz for a single MSPA. For 2×2 array structure, a gain of 7.713 dB at 5.3 GHz is observed. Such antennas find many applications in 5G devices and technology.

Keywords : Ansys HFSS, gain, return loss, slot array, microstrip patch antenna, 5G antenna
Conference Title : ICRAAAASPAAM 2023 : International Conference on Recent Advances in Array Antenna and Array Signal Processing and Antenna Array Measurements
Conference Location : Paris, France
Conference Dates : July 10-11, 2023