World Academy of Science, Engineering and Technology
International Journal of Electrical and Computer Engineering
Vol:14, No:06, 2020

Graphene-Based Reconfigurable Lens Antenna for 5G/6G and Satellite Networks

Authors : André Lages, Victor Dmitriev, Juliano Bazzo, Gianni Portela

Abstract : This work evaluates the feasibility of the graphene application to perform as a wideband reconfigurable material for lens antennas in 5G/6G and satellite applications. Based on transformation optics principles, the electromagnetic waves can be efficiently guided by modifying the effective refractive index. Graphene behavior can range between a lossy dielectric and a good conductor due to the variation of its chemical potential bias, thus arising as a promising solution for electromagnetic devices. The graphene properties and a lens antenna comprising multiples layers and periodic arrangements of graphene patches were analyzed using full-wave simulations. A dipole directivity was improved from 7 to 18.5 dBi at 29 GHz. In addition, the realized gain was enhanced 7 dB across a 14 GHz bandwidth within the Ka/5G band.

Keywords : 5G/6G, graphene, lens, reconfigurable, satellite
Conference Title : ICRSAT 2020 : International Conference on Radio Science and Antenna Technology
Conference Location : New York, United States
Conference Dates : June 04-05, 2020

Open Science Index, Electrical and Computer Engineering Vol:14, No:06, 2020 publications.waset.org/abstracts/121554.pdf