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Fabrication and optimization of bi-quad antenna and energy-efficient balanced RF power amplifier for 5G-LTE multi-carrier applications

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Status: Final

Date of publication: 15 December 2022

Published in: ITU Journal on Future and Evolving Technologies, Volume 3 (2022), Issue 3, Pages 874-885

Article DOI : <https://doi.org/10.52953/WCQW1171>



Abstract:

Wireless technology is presently one of the most actively researched fields of digital communication systems. Wireless communication technologies are insufficient without an understanding of antenna design and operation. A wide range of radio frequency equipment, including microwave antennas, microwave ovens, cordless telephones, and medical devices, utilize the 2.4 GHz band. In this article, a parabolic mesh dish was used to build and improve a bi-quad antenna with a central working frequency of 2.445 GHz. The bi-quad antenna was put in a parabolic mesh dish to optimize wave propagation. The findings show that the antenna obtained a signal strength range of 70% to 80%, increasing the directivity of WLAN coverage. The bi-quad antenna feed was placed in the center of a mesh dish, which assists in focusing radio waves onto the antenna. The bi-quad antenna outperformed the omnidirectional antenna, which had a signal strength of 56%. The results of each antenna test were separately simulated in MATLAB. The combined impact of bi-quad and parabolic was then duplicated using mathematical models, resulting in a unique waveform propagation pattern known as para-quad, which improved performance. A balanced RF power amplifier was conceived and built in this study. A 2.620 - 2.690GHz frequency range on a large signal Si-LDMOS transistor model achieves 53% PAE, 41dBm power output, and 14 dB gain at the P1dB saturation point.

Keywords: Bi-quad antenna, fabrication, fifth generation, optimization radio frequency

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