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Abstract

Design , Simulation & Fabrication of Ultra- wide band microstrip patch antenna for wireless application

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Abstract:

Ultra wideband (UWB) technology is one of the most widely technologies used in wireless communication system to support the application that required high data rate and high speed. Since the release by the Federal Communications Commission (FCC) of a bandwidth of 7.5GHz (from 3.1GHz to 10.6GHz) for UWB wireless communications, UWB is rapidly developed to justify the needs of modern wireless communication applications. The development of UWB technology includes antenna as an essential part of wireless communication systems. However, there are more challenges in designing UWB antenna than a narrow band one. A suitable UWB antenna should be capable of operating over an ultra wide bandwidth as allocated by the FCC. At the same time, satisfactory radiation properties over the entire frequency range are also necessary. Besides that, small size, lightweight, low profile and low cost are also features highly required to be in UWB antenna. The purpose of this work is to design and fabricate ultra wideband microstrip patch antenna for wireless application with optimum performance such as wide bandwidth, good matching impedance, small antenna size exhibits and its E and H–plane radiation patterns are stable over the UWB frequency range . To achieve that, slotted partial ground plane, steps notches at the bottom of the patch and slots on the patch techniques are applied on a conventional rectangular microstrip patch antenna excited directly using microstrip line technique. Designed UWB antenna simulated using Computer Simulation Technology and fabricated on FR4 substrate. Both simulation and measurement results show that UWB antenna has good performance. Return loss results satisfy UWB technology frequency range under -10dB; from 3.23 GHz to 10.89 GHz for simulation, while measured return loss slightly shifted to start form 3.8 GHz to 10.6 GHz. Omin-directional radiation patterns in both E and H plane with sufficient gain at different frequencies in UWB frequency band. Therefore, the antenna design has to evolve to meet the new requirements. By considering the increase of low cost, compactness of electronic systems, and a need of embedding two or more narrowband systems together, microstrip patch antennas are most widely candidates used because of their several advantages such as light weight, low volume, low fabrication cost and capability of dual, triple and more frequency operations. For high data rate transmission system and multifunctional devices, we need wideband directional microstrip antennas with constant gain over the wide frequency range. Designing a low-profile directional microstrip antenna for these applications is very challenging.

Biography:

Suleiman Babani a PhD student at department of electrical engineerimg , faculty of engineering bayero university kano, nigeria , He is an academician for almost 10 years at the same department, he did his first degree from the same department and also did his Master degree from UNIVERSITI TEKNOLOGY MALAYSIA his area of research are antenna design. He has published 8 international papers in reputed journals and 9 internation conference proceeding all in electrical and communication engineering, and he received 2 international merit award on antennaa design.

Publication of speakers:

1. Yang, Limin & Li, Yaohua & Li, Zixin & Wang, Ping & Xu, Shukai & Gou, Ruifeng. (2017). Loss Optimization of MMC by Second-Order Harmonic Circulating Current Injection. IEEE Transactions on Power Electronics. PP. 1-1. 10.1109/TPEL.2017.2751068.
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3. Li, Yalong & Jones, Edward & Wang, Fei. (2016). Circulating Current Suppressing Control's Impact on Arm Inductance Selection for Modular Multilevel Converter (MMC). IEEE Journal of Emerging and Selected Topics in Power Electronics. PP. 1-1. 10.1109/JESTPE.2016.2617865.

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