Scopus

Documents

Hamzah, S.Z.M., Malek, N.F.A., Mohamad, S.Y., Mohd Isa, F.N.

Design and Fabrication of High-Gain Dual Linearly Polarized Patch antenna at 28 GHz
(2024) *Journal of Physics: Conference Series*, 2922 (1), art. no. 012005, .

DOI: 10.1088/1742-6596/2922/1/012005

Microwave, Communication, and Information System Engineering (MCISERG), Kulliyyah of Engineering, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur53100, Malaysia

Abstract
Extensive research on millimeter-wave frequency bands is currently in rapid development throughout the world, specifically at an operating frequency of 28 GHz, and Malaysia is no exception. The most conventional patch antennas covered a limited polarization feature of single polarization of radiated beam signals. In order to meet the high demands of network users with a higher data rate, the radiated beam signal coverage should be as wide as possible to ensure the stability and consistency of the received signals for the users. This leads to the development of the dual polarization feature of single-layer antenna design. In this work, a dual element (70 x 70 mm2) patch antenna at 28 GHz has been designed using CST Studio Suite and fabricated using Rogers RT5880. The antenna has been oriented to the right (+45°) and to the left (-45°) from the normal plane to realize a dual linear polarization state. The simulation and measurement results show that the reflection coefficient obtained for all antennas is less than -10 dB. The simulated and measured radiation patterns of the antennas are also shown in this paper. It is observed that the proposed antenna achieves a dual-polarized state with a higher gain of 11.16 dBi, compared to 4.97 dBi for a single patch. This dual-polarized antenna can be applied in various applications, particularly for MIMO and 5G mobile communication networks.

Index Keywords
4G mobile communication systems, 5G mobile communication systems, Integrated circuit design, Mobile antennas, Polarization, Rock mechanics, Structural dynamics; High data rate, High data-rates, High demand, High gain, Linearly polarized, Malaysia, Millimeter wave frequency band, Network users, Operating frequency, Single polarization; Slot antennas

References

- Mohamed, MY, Dini, AM, Soliman, MM, Imran, AZM
  Design of 2times 2 Microstrip Patch Antenna Array at 28 GHz for Millimeter Wave Communication
  (2020) *IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT)*, pp. 445-450.

- Meem, RJ, Haque, MR, Khan, MM, Rahman, HMA
  Development of A 28 GHz 5G Wideband Novel Compact Antenna for Wireless Body-Centric Network in Medical Applications
  (2023) *International Conference on Information and Communication Technology for Sustainable Development (ICICT4SD)*, pp. 51-55.
  IEEE

- Jose, MC, Radha, S, Sreeja, BS, Gulam Nabi Alsath, M, Kumar, P
  Compact dual-band millimeter-wave antenna for 5G WLAN
  (2022) *Int J Microw Wirel Technol*,

- Panagiotis, P, Stavros, K.
  A 2021 A Low Profile Dual Band (28/38GHz) and Dual Polarized Antenna for 5G MIMO Applications
  IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (APS/URSI), pp. 1615-1616.

- Lv, S
  Design of Dual-Band Dual-Polarized Stacked Patch Antenna for Millimeter-wave Communications

(2022) *IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications (IMWS-AMP)*, pp. 1-3.

- Sun, Y, Liao, S, Zhang, W, Che, W, Xue, Q
  A Compact Dual-Polarized Stacked Patch Antenna for 5G Millimeter-Wave Applications
  (2020) *IEEE Asia-Pacific Microwave Conference (APMC)*, pp. 320-322.

- Sun, Z, Jiang, X, Liu, Y, Cheng, L, He, T
  Millimeter-Wave ±45° Dual Slant Polarization Wide-Beam Antenna
  (2022) *International Conference on Microwave and Millimeter Wave Technology (ICMMT)*, pp. 1-3.

- Tong, X, Jiang, ZH, Yu, C, Wu, F, Xu, X, Hong, W
  A wideband dual-linearly-polarized millimeter wave antenna for 5G terminal application
  (2020) *International Symposium on Antennas and Propagation (ISAP)*, pp. 589-590.

- Tsao, YF, Desai, A, Hsu, HT
  Dual-band and dual-polarization CPW Fed MIMO antenna for fifth-generation mobile communications technology at 28 and 38 GHz
  (2022) *IEEE Access*, 10, pp. 46853-46863.

- Zhu, Y, Ma, S, Chen, K, Hong, W
  A Dual-Band Stacked Slotted Circular Patch Antenna for 5G Millimeter-Wave Applications
  (2023) *8th International Conference on Communication and Electronics Systems (ICCES)*, pp. 455-459.

- Li, JW, Hu, Y, Xiang, L, Ma, ZH, Hong, W
  Millimeter Wave Broadband Circularly Polarized Antenna and Array with Stacked Structure
  (2021) *IEEE MTT-S International Wireless Symposium (IWS)*, pp. 1-3.

Correspondence Address
Mohamad S.Y.; Microwave, Jalan Gombak, Kuala Lumpur, Malaysia; email: smohamad@iium.edu.my

Sponsors: IEEE AP-S Tokyo Chapter
Publisher: Institute of Physics

Conference name: 2024 Malaysia-Japan Workshop on Radio Technology, MJWRT 2024
Conference date: 26 August 2024 through 28 August 2024
Conference code: 205347

ISSN: 17426588
Language of Original Document: English
Abbreviated Source Title: J. Phys. Conf. Ser.
2-s2.0-85214376645
Document Type: Conference Paper
Publication Stage: Final
Source: Scopus