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Design and optimize microstrip patch antenna array using the active element pattern technique (Article) (Open Access)

Ali, K.[a], Malek, N.A.[a], Jusoh, A.Z.[a], Mohamad, S.Y.[a], Abidin, Z.Z.[b], Asnawi, A.L.[a]

[a]Department of Electrical and Computer Engineering, International Islamic University Malaysia, Malaysia
[b]Research Centre of Applied Electromagnetics, Faculty of Electrical & Electronic Engineering, Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia

Abstract

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Microstrip patch antennas are widely used in modern day communication devices due to their light weight, low cost and ease of fabrication. In this paper, we have designed and fabricated two Microstrip Patch Antennas (slotted-ring and truncated-slotted ring) and array at 2.4 GHz for Wireless Local Area Network (WLAN) applications using Computer Simulation Technology, CST. The antenna design consists of rectangular radiating patch on Rogers RT5880 substrate and is excited by using coaxial probe feeding technique. The truncated-slotted ring has been designed on top of the radiating patch to improve bandwidth. The simulation and measurement results of the both antennas are in close agreement with each other. Due to the good agreement of simulation and measurement results of truncated-slotted ring antenna in comparison with slotted-ring antenna, it has been selected for antenna array design. The simulated and measured S11 of truncated-slotted ring antenna shows -21dB and -15.6 dB at 2.4 GHz respectively. Then, the antenna has been formed into 1x4 array in order to observe its beamforming capability. The proposed antenna array is suitable for 802.11b/g/n Wi-Fi standard which is proposed to be used for IoT.

SciVal Topic Prominence

Topic: Microstrip antennas | Slot antennas | Rectangular microstrip

Prominence percentile: 90.678

Author keywords

Active element pattern | Beamsteering | Patch antenna | Slotted ring | WiFi

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References (18)

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1 Chen, Z.N., Qing, X., See, T.S.P., Toh, W.K.
Antennas for WiFi connectivity

(2012) *Proceedings of the IEEE*, 100 (7), art. no. 6166456, pp. 2322-2329. Cited 37 times.
http://ieeexplore.ieee.org.ezproxy.um.edu.my/xpl/RecentIssue.jsp?punumber=5
doi: 10.1109/JPROC.2012.2183830

View at Publisher

2 Su, S.-W.
High-gain dual-loop antennas for MIMO access points in the 2.4/5.2/5.8 GHz bands

(2010) *IEEE Transactions on Antennas and Propagation*, 58 (7), art. no. 5454301, pp. 2412-2419. Cited 74 times.
doi: 10.1109/TAP.2010.2048871

View at Publisher

3 Wong, K.-L., Lai, J.-W., Hsiao, F.-R.
Omnidirectional planar dipole-array antenna for 2.4/5.2-GHz WLAN access points

(2003) *Microwave and Optical Technology Letters*, 39 (1), pp. 33-36. Cited 43 times.
doi: 10.1002/mop.11118

View at Publisher

4 Wang, D., Chan, C.H.
Multiband Antenna for WiFi and WiGig Communications

(2016) *IEEE Antennas and Wireless Propagation Letters*, 15, art. no. 7120076, pp. 309-312. Cited 36 times.
www.ieee.org
doi: 10.1109/LAWP.2015.2443013

View at Publisher

5 Ammann, M.J., Chen, Z.N.
Wideband monopole antennas for multi-band wireless systems

(2003) *IEEE Antennas and Propagation Magazine*, 45 (2), pp. 146-150. Cited 311 times.
doi: 10.1109/MAP.2003.1203133

View at Publisher

6 Pan, Y.-M., Leung, K.W., Lu, K.
Compact quasi-isotropic dielectric resonator antenna with small ground plane

(2014) *IEEE Transactions on Antennas and Propagation*, 62 (2), art. no. 6671377, pp. 577-585. Cited 62 times.
doi: 10.1109/TAP.2013.2292082

View at Publisher

7 Wang, D., Wong, H., Chan, C.H.
Small patch antennas incorporated with a substrate integrated irregular ground

(2012) *IEEE Transactions on Antennas and Propagation*, 60 (7), art. no. 6192313, pp. 3096-3103. Cited 20 times.
doi: 10.1109/TAP.2012.2196915

View at Publisher

8 Pozar, D., Schaubert, D.
(1995) *Microstrip Antennas*. Cited 655 times.
New York: Institute of Electrical and Electronics Engineers

9 Balanis, C.
(2016) *Antenna Theory: Analysis and Design*. Cited 15222 times.
4th ed. Hoboken, United States: John Wiley & Sons

10 Garg, R., Bhartia, P., Bahl, I., Ittipiboon, A.
(2001) *Microstrip Antenna Design Handbook*. Cited 3354 times.
Boston: Artech House

11 Hall, P., James, J.
(1989) *Handbook of Microstrip Antennas*. Cited 1439 times.
London, UK: Peter Peregrinus Ltd

12 Ammann, M.
Design of rectangular microstrip patch antennas for the 2.4 GHz band

(1997) *Applied Microwave and Wireless*, 9 (6), pp. 24-34. Cited 28 times.

13 Huang, J.
The Finite Ground Plane Effect on the Microstrip Antenna Radiation Patterns

(1983) *IEEE Transactions on Antennas and Propagation*, 31 (4), pp. 649-653. Cited 206 times.
doi: 10.1109/TAP.1983.1143108

View at Publisher

14 Milligan, T.A.
Modern Antenna Design: Second Edition

(2005) *Modern Antenna Design: Second Edition*, pp. 1-614. Cited 467 times.
http://onlinelibrary.wiley.com.ezproxy.um.edu.my/book/10.1002/0471720615
ISBN: 0471457760; 978-047145776-3
doi: 10.1002/0471720615

View at Publisher

15 Sidhu, A.K., Sivia, J.S.

Microstrip Rectangular Patch Antenna for S and X band applications

(2016) *Proceedings of the 2016 IEEE International Conference on Wireless Communications, Signal Processing and Networking, WiSPNET 2016*, art. no. 7566130, pp. 248-251. Cited 8 times.
ISBN: 978-146739337-9
doi: 10.1109/WiSPNET.2016.7566130

View at Publisher

16 Malek, N.A., Ali, K., Jusoh, A.Z., Mohamad, S.Y., Abidin, Z.Z., Asnawi, A.L.

Beamforming Capability of a Cross-Slotted Ring Patch Antenna Array at 2.4 GHz Wireless Applications

(2018) *Proceedings of the 2018 7th International Conference on Computer and Communication Engineering, ICCCE 2018*, art. no. 8539265, pp. 119-123.
http://ieeexplore.ieee.org.ezproxy.um.edu.my/xpl/mostRecentIssue.jsp?punumber=8510540
ISBN: 978-153866991-4
doi: 10.1109/ICCCE.2018.8539265

View at Publisher

17 Josephine Dhivya, J., Ramaswami, M.

Ingenious method for conducive handoff appliance in cognitive radio networks

(2018) *International Journal of Electrical and Computer Engineering*, Part II 8 (6), pp. 5195-5202. Cited 3 times.
http://www.iaescore.com/journals/index.php/IJECE/article/view/11475/10054
doi: 10.11591/ijece.v8i6.pp.5195-5202

View at Publisher

18 Malek, N.A., Khalifa, O.O., Abidin, Z.Z., Mohamad, S.Y., Abdul Rahman, N.A.

Beam steering using the active element pattern of antenna array

(2018) *Telkomnika (Telecommunication Computing Electronics and Control)*, 16 (4), pp. 1542-1550. Cited 3 times.
http://journal.uad.ac.id/index.php/TELKOMNIKA/article/download/9040/pdf_726
doi: 10.12928/TELKOMNIKA.v16i4.9040

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Malek, N.A.; Department of Electrical and Computer Engineering, Kulliyyah of Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia; email:norun@iium.edu.my