A Dual-Band Millimeter-Wave Microstrip Antenna Array for 5G Applications

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Abstract

In this paper, microstrip antenna array is discussed. The proposed antenna array is designed for millimeter-wave applications targeting the 24.25 GHz to 27.5 GHz and 26.5 GHz to 29.5 GHz range of the frequency spectrum. The dielectric substrate considered is the Rogers RT Duroid 6002. Initially, a conventional antenna is designed and simulated. The basic design is studied first and then is subjected to the next stage in the design. A 2X1 microstrip antenna array is later evolved from the initial conventional design whose radiation characteristics are studied. Later stage, another 2X1 antenna array is connected, which makes the end structure a combination of two 2X1 microstrip antenna array connected back to back. The end result is a 4 element antenna array with dual-band characteristics with S11 parameter -32.88 dB at 24.67 GHz with a gain of 8.67 dB and -35.07 dB at 29.35 GHz with a gain of 10.30 dB. The end structure is compared with the initial and intermediate stage designs in terms of S11, gain and VSWR and important findings are tabulated.

References
1. El-Bacha, A. and Sarkis, R., 2016, September. Design of tilted taper slot antenna for 5G base station antenna circular array. In 2016 IEEE Middle East Conference on Antennas and Propagation (MECAP) (pp. 1-4). IEEE.

2. Gupta, P., 2013. Evolvement of mobile generations: 1G to 5G. International Journal for Technological Research in Engineering, 1, pp.152-157.3

3. Rappaport, T.S., Sun, S., Mayzus, R., Zhao, H., Azar, Y., Wang, K., Wong, G.N., Schulz, J.K., Samimi, M. and Gutierrez, F., 2013. Millimeter wave mobile communications for 5G cellular: It will work!. IEEE access, 1, pp.335-349.

4. Pi, Z. and Khan, F., 2011. An introduction to millimeter-wave mobile broadband systems. IEEE communications magazine, 49(6), pp.101-107.

5. Sulyman, A.I., Nassar, A.T., Samimi, M.K., MacCartney, G.R., Rappaport, T.S. and Alsanie, A., 2014. Radio propagation path loss models for 5G cellular networks in the 28 GHz and 38 GHz millimeter-wave bands. IEEE Communications Magazine, 52(9), pp.78-86.

6. Rappaport, T.S., Gutierrez, F., Ben-Dor, E., Murdock, J.N., Qiao, Y. and Tamir, J.I., 2012. Broadband millimeter-wave propagation measurements and models using adaptive-beam antennas for outdoor urban cellular communications. IEEE transactions on antennas and propagation, 61(4), pp.1850-1859.

7. Ioannis, G. and Katherine, S., 2018, May. Design of ultra wide band slot antennas for future 5G mobile communication applications. In 2018 7th International Conference on Modern Circuits and Systems Technologies (MOCAST) (pp. 1-4). IEEE.

8. Jilani, S.F. and Alomainy, A., 2017, July. Millimeter-wave conformal antenna array for 5G wireless applications. In 2017 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting (pp. 1439-1440). IEEE.

9. Srivastava, S., Singh, V.K., Singh, A.K. and Ali, Z., 2013. Duo triangle shaped microstrip patch antenna analysis for WiMAX lower band application. Procedia Technology, 10, pp.554-563.

**Index Terms**

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**Keywords**

Millimeter-wave communications, dual-band antenna, 5G applications, mm-Wave.
