

Dual-Polarized Multi-Antenna System for Massive MIMO Cellular Communications

Authors : Naser Ojaroudi Parchin, Haleh Jahanbakhsh Basherlou, Raed A. Abd-Alhameed, Peter S. Excell

Abstract : In this paper, a multiple-input/multiple-output (MIMO) antenna design with polarization and radiation pattern diversity is presented for future smartphones. The configuration of the design consists of four double-fed circular-ring antenna elements located at different edges of the printed circuit board (PCB) with an FR-4 substrate and overall dimension of $75 \times 150 \text{ mm}^2$. The antenna elements are fed by 50-Ohm microstrip-lines and provide polarization and radiation pattern diversity function due to the orthogonal placement of their feed lines. A good impedance bandwidth ($S_{11} \leq -10 \text{ dB}$) of 3.4-3.8 GHz has been obtained for the smartphone antenna array. However, for $S_{11} \leq -6 \text{ dB}$, this value is 3.25-3.95 GHz. More than 3 dB realized gain and 80% total efficiency are achieved for the single-element radiator. The presented design not only provides the required radiation coverage but also generates the polarization diversity characteristic.

Keywords : cellular communications, multiple-input/multiple-output systems, mobile-phone antenna, polarization diversity

Conference Title : ICSASWL 2020 : International Conference on Smart Antenna Systems and Wireless LANs

Conference Location : London, United Kingdom

Conference Dates : February 13-14, 2020