

A Design of Beam-Steerable Antenna Array for Use in Future Mobile Handsets

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Abstract : A design of beam-steerable antenna array for the future cellular communication (5G) is presented. The proposed design contains eight elements of compact end-fire antennas arranged on the top edge of smartphone printed circuit board (PCB). Configuration of the antenna element consists of the conductive patterns on the top and bottom copper foil layers and a substrate layer with a via-hole. The simulated results including input-impedance and also fundamental radiation properties have been presented and discussed. The impedance bandwidth ($S_{11} \leq -10$ dB) of the antenna spans from 17.5 to 21 GHz (more than 3 GHz bandwidth) with a resonance at 19 GHz. The antenna exhibits end-fire (directional) radiation beams with wide-angle scanning property and could be used for the future 5G beam-forming. Furthermore, the characteristics of the array design in the vicinity of user-hand are studied.

Keywords : beam-steering, end-fire radiation mode, mobile-phone antenna, phased array

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