

Pattern-reconfigurable antenna using four-elements dipole array for 5G beam-switching applications

Saber Dakhli¹, Jean-Marie Floc'h², Ameni Mersani³, and Hatem Rmili⁴

¹Genie Electrique et Electronique de Paris

²Institut d'Electronique et des Technologies du NumeRique

³Universite de Tunis El Manar Faculte des Sciences de Tunis

⁴King Abdulaziz University Faculty of Engineering

November 08, 2024

Abstract

This article presents a circular array using four-elements dipole with beam-switching capabilities for 5G communications. The beam can switch in four directions by controlling the switch states implemented in the arms of each dipole. The different antenna modes lead to different radiation behaviors. The first is a directional behavior containing 4 radiation modes depending on the dipole fed into the network. The second type of radiation has a double beam pattern according to the two fed dipoles. According to the simulated results, a corresponding overall bandwidth of 932.3 MHz ($S_{11} < -10$ dB) can be obtained with a peak gain of 3.15 dBi and an overall efficiency of 80%. The proposed antenna is fabricated and measured to verify the simulation results. This low-cost, efficient, and easy-to-design antenna array can be very useful for 5G beam switching applications.

Hosted file

Papier_Engineering_reports_submitted_v0.docx available at <https://authorea.com/users/853803/articles/1239247-pattern-reconfigurable-antenna-using-four-elements-dipole-array-for-5g-beam-switching-applications>