

Reconfigurable four-parasitic-elements patch antenna for high-gain beam switching application

Abstract

A reconfigurable beamforming of a four-parasitic-elements patch antenna (FPPA) for WiMAX application is presented. The proposed FPPA is successfully capable to steer the radiation pattern in azimuth planes (0° , 45° , 135° , 225° , and 315° angles) and in elevation plane (0° , 13° , 15° , 10° , and 12°). This is realized in the unique form of four parasitic elements encircling the center main radiator. The activation of the parasitic required a shorting pin to the ground that indicates ON state condition, and vice versa. It is discovered in CST simulation software that the specified location of the pins are really significant to ensure the parasitic performs either as a reflector or director. Moreover, each of the shorting pins is linked to the RF p-i-n diode BAR5002v switch. Also, the FPPA is fabricated on a 130-mm square Taconic substrate. The proposed antenna design has a maximum gain of 8.2 dBi at all desired angles with a half-power beam width of 58° .

Keywords; High-gain antenna, p-i-n diode switches, reconfigurable parasitic antenna