

## **A fabrication of intelligent spiral reconfigurable beam forming antenna for 2.35 2.39GHz applications and path loss measurements**

### **Abstract**

A reconfigurable beam forming antenna prototype using a spiral feed line is proposed in this paper. The presented antenna is integrated with PIN diode switches at a specific location of spiral feed line. It is discovered that the beam steering ability is greatly influenced by the spiral arm feed network. Four PIN diode switches have been incorporated at four different arms of spiral feed line to realize a beam forming ability. The intelligence behaviour of this antenna is conferred when the switches are connected to programmable intelligent computer (PIC) microcontroller. Certain configurations of PIC allow the antenna's radiation patterns to be adaptively changed within 0.01 ms. Therefore, the proposed antenna is capable of electronically forming the beam up to four different angles of  $+176^\circ$ ,  $+10^\circ$ ,  $-1^\circ$  and  $-12^\circ$ . This antenna is small in size with 100 mm by 100 mm of substrate dimension. In this research, the site field antenna performance relying on the received signal strength (RSS) testing is tested intensively in Universiti Malaysia Perlis with varied distant points of line-of-sight (LOS) and non-line-of-sight (NLOS) propagation. With good simulation and measurement results, this antenna could be a promising candidate to be installed in applications such as a smart antenna system, cognitive radio, WiMAX and long term evolution (LTE).

### **Keywords**

Antenna performance; Non line of sight propagations (NLOS); PIN diode switches; Spiral antennas