

ABSTRACT

A multimode antenna structure is provided for transmitting and receiving electromagnetic signals in a communication device. The communication device includes circuitry for processing signals communicated to and from the antenna structure. The antenna structure includes a plurality of antenna ports for coupling to the circuitry; a plurality of antenna elements, each operatively coupled to a different one of the antenna ports; and a plurality of connecting elements. The connecting elements each electrically connect neighboring antenna elements such that the antenna elements and the connecting elements are arranged about the periphery of the antenna structure and form a single radiating structure. Electrical currents on one antenna element flow to connected neighboring antenna elements and generally bypass the antenna ports coupled to the neighboring antenna elements such that an antenna mode excited by one antenna port is generally electrically isolated from a mode excited by another antenna port at a given desired signal frequency range, and the antenna structure generates diverse antenna patterns.