Technology Licensing Opportunity

UNIVERSITY OF SASKATCHEWAN

POLYMER RESONATOR ANTENNA ARRAYS

Invention:

The invention describes a radically different approach to fabrication of compact radio frequency (RF) antennas and devices using non-traditional polymer-based materials, enabling improved performance and increased functionality for various emerging wireless communication and sensor devices. The relentless pursuit of device miniaturization for such systems often comes at the price of compromised performance. One of the biggest obstacles to further miniaturization of RF wireless devices is the antenna structure, which accounts for a large portion of the total size. Recently, ceramic-based dielectric resonator antennas (DRAs) have attracted increased attention for miniaturized wireless and sensor applications at microwave and millimeter-wave frequencies. DRAs are three dimensional structures with lateral dimensions that can be several times smaller than traditional antennas, and offer superior performance. Despite the superior properties of DRAs, they have not been widely adopted for commercial wireless applications due to complex and costly fabrication processes related to their three dimensional structure and difficulties in shaping the hard ceramic material. The new approach described in this invention to facilitate the adoption of DRAs for commercial applications is to use polymer-based materials (so-called **polymer resonator antennas - PRAs).** The premise of the approach was two-fold: 1) the natural softness of polymers could dramatically simplify fabrication of dielectric elements, enabling for instance the use of lithographic batch fabrication or other 3D printing or micromachining processes; 2) the elements must be effectively excited to resonate and radiate at microwave and millimeter-wave frequencies.

In this case demonstrating arrays of low permittivity Polymer-based Resonator Antenna elements with different configurations. Individual array elements can be fabricated with complicated geometries; these elements can be assembled into complicated patterns as a single monolithic fabricated structure using narrow wall connecting structures, which removes the requirement to position and assemble the array elements. Effective excitation is achieved by one of a number of coupling methods, including standing metal strip feeding on the vertical sides of the elements, feeding by tall metal transmission lines in contact or in close proximity to the vertical sides of the elements, modified micro strip feeding, or aperture feeding by using a slot in the ground plane underneath the elements. The wideband array feeds are realized by optimized transmission line distribution networks which include wideband matching sections.

Applications:

Sensors for Medical Devices
Unmanned Vehicle Systems
RFID Systems using Nano-technology
Body Scan Systems
Wireless Infrastructure

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