**A Compact, Low-Profile, UWB Simultaneous Transmit and Receive (STAR) Antenna with Monopole-Like Radiation Characteristics**

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Simultaneous transmit and receive (STAR) antennas are key components of in-band full-duplex wireless communication systems that have the potential to double data throughput and spectral efficiency. STAR antennas are also useful in military communications and electronic warfare applications where the ability to listen while talking or increase the probability of intercept of uncooperating emitters while jamming is of interest. For a STAR antenna to work effectively, a high isolation between the transmitter (TX) and receiver (RX) paths is required to suppress the self-interference. By maximizing the isolation between the transmit and receive antennas, the isolation requirements of the subsequent system components (e.g. circulators, power amplifier and LNA, cancellation circuits, etc.) will be alleviated. In addition to the high isolation, many of the military applications that use STAR antennas also need to operate over wide or ultra-wide bandwidths, have low-profile antennas with low visual signatures, and have vertically-polarized omni-directional radiation patterns.

In this abstract, a wideband low-profile STAR antenna with vertically-polarized omni-directional radiation patterns is presented. In this design, a mono-cone antenna with a circular top loading is used for the TX path, while a circular array of four identical loop antennas functions as a single receiver antenna. The proposed TX and RX antennas radiate with the same polarization and radiation patterns. To achieve high isolation, the opposing RX loop antennas are fed with a 180° phase difference and the same magnitudes. This creates a zero in the near field of these antennas at the location of the TX antenna and allows for reducing the mutual coupling between the transmit and receive antennas. To decrease the lowest operating frequency, four parasitic monopole-like elements are introduced. Omni-directional radiation patterns in the azimuth plane are realized by feeding the adjacent RX loop antennas with a 90° phase difference. The parasitic elements are strategically placed to maintain omni-directionality of the antenna in the desired band. The STAR antenna is simulated using CST Microwave Studio. The simulated results demonstrate that both TX and RX antennas can operate from 0.57 GHz to 1.55 GHz (2.7:1) with the same vertically-polarized radiation patterns. The isolation between TX and RX antennas is greater than 40 dB while the gain variation is less than 5 dB for both antennas. The proposed STAR antenna occupies a dimension of $0.76\,\lambda \times 0.76\,\lambda \times 0.24\,\lambda$, where $\lambda$ is the free-space wavelength at the lowest frequency of operation (0.57 GHz). The design details and the measurement results of a fabricated antenna prototype will be presented and discussed at the symposium.