

Compact Low Profile Common Aperture Polarization and Pattern Diversity Antennas

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Abstract: This paper presents compact and low profile antenna architectures that can provide polarization and pattern diversity schemes from a common aperture. The proposed antennas make use of a novel miniaturized microstrip antenna topology with an open area in its middle. The two split sections of the miniaturized microstrip antenna are magnetically coupled through two vertical shorting strips in the middle. This allows for incorporation of another small antenna element within the same aperture having either polarization or pattern that is orthogonal to the miniaturized microstrip antenna with low envelop correlation. Topologies of polarization and pattern diversity antennas are optimized for size reduction and minimum envelop correlation. Although the proposed diversity antennas consists of two antenna elements with different polarizations or radiation patterns, they just occupy about 30% of the area of the conventional microstrip antenna with the dimension of $\lambda_g/2 \times \lambda_g/2$ where λ_g is the guided wavelength at the resonant frequency. In addition, for both types of the proposed diversity antennas, the envelop correlations between radiation patterns of the two antenna elements are lower than -30dB over 10-dB return loss bandwidth of the proposed miniaturized microstrip antenna.