

A Dual-Band Dual-Polarization Diversity Patch Antenna

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In this paper, we present a dual-band patch antenna which can provide a pair of orthogonal linear polarizations at the higher operating frequency (5.8GHz) or another pair of orthogonal linear polarizations at the lower operating frequency (1.575GHz). This novel printed antenna consists of dual-diplexer networks, dual patches with a small square patch on the inside and a ring patch on the outside. The feeding network is properly designed for a pair of dual-band diplexer by using a parallel interconnection of two band-pass filters as a diplexer. The dual patches are printed on the same layer, and each patch is aperture-coupled by two line-slot coupling slots. For the lower operating frequency, the purpose of using ring patch is to minimize the size of patch without degrading radiation characteristics. Therefore, when the antenna is operated at the lower resonant frequency (1.575GHz), the signal will pass through the lower-frequency band-pass filter of the diplexer and couple to the outer ring patch through an aperture to generate a linear polarization sense at 1.575GHz. At the same time, another input port will generate an orthogonal type of linear polarization sense. When the antenna is operated at the higher resonant frequency (2.45GHz), the signal will pass through the higher-frequency band-pass filter of the diplexer and couple to the inner complete square patch through an aperture to generate a linear polarization sense. At the same time, another input port will generate an orthogonal type of linear polarization sense. In this presentation, both the numerical and experimental results will be presented to validate our design. Also, the detail design process and principle will be discussed in the presentation.