

Compound Microstrip Antenna with Triple Reconfigurability

Technology Domain: Communication

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Technology Summary:

This invention introduces a novel compound reconfigurable microstrip patch antenna designed for advanced wireless communication, particularly navigation receiver systems like IRNSS. The key technical solution is a compact, three-layer stacked antenna featuring a lower element for L5-band (1.176 GHz), an upper element for S-band (2.492 GHz), and a top layer with an RF PIN diode-loaded octagonal parasitic ring. This architecture, fed by four coaxial feeds, provides simultaneous frequency and polarization diversity.

The key inventive feature is its unique beamwidth reconfigurability across all elevation planes at the S-band. By activating/deactivating the RF PIN diodes, the antenna dynamically switches between wide and narrow beamwidths (e.g., 98.64° to 55.07° for vertical component). Results demonstrate excellent impedance matching and significant gain reconfigurability (9-10 dB) near the horizon. This dynamic control effectively mitigates interference and multipath effects, making the antenna highly useful for robust and precise navigation applications in challenging, variable environments.

