An ISGW Millimeter-Wave Filtering Antenna with Four Controllable Radiation Nulls

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Abstract

This paper presents a millimeter-wave Integrated Substrate Gap Waveguide (ISGW) filtering antenna with four controllable radiation nulls, two on each of its upper and lower stop bands. These radiation nulls can be adjusted by manipulating the dimensions of the stepped-impedance resonators (SIRs), complementary U-slots, and passive coplanar parasitic patches. This filtering antenna has the advantages of separately controllable radiation nulls and flexible adjustment of selectivity and gain curve roll-off. The simulation results demonstrate that the antenna operates at a center frequency of 25.4 GHz, with a relative bandwidth of 14.3% (23.76-27.04 GHz), and achieves a realizable average gain of 7.6 dBi.

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