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Incidence of Circularly polarized S-band square patch antenna with a single cut for S-band small satellites applications

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In the present study, the main purpose is to design an S-band patch antenna which is basically directional and circularly polarized for S-band small satellites applications. This antenna has a square shape ground and on the upper portion there is a patch which is also square but with a single truncated corner in order to get circular polarization, the connection between the patch and the ground has been established using a coaxial probe. The designed antenna can be easily integrated with a small satellite body due to the simplicity of the design. Commercially available finite element method solver based high frequency structural simulator (HFSS) have been used in this analysis. The proposed antenna achieved desirable results with an axial ratio of 0.17 dB at center frequency of 2.2 GHz and less than 3 dB for a frequency band of 31 MHz and beam width of more than 110° . The gain achieved by this antenna is around 7 dBi at center frequency. The directional radiation pattern, circular polarization (CP), and high gain characteristics make the proposed antenna suitable for Earth observation small satellites applications in S-band.