

Developing a Millimeter-wave High-Gain Antenna for Beamforming at Two Frequency-Bands and Dual Function of LEO Satellite Communication

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Mobile carriers are striving to get more bands and a larger bandwidth for faster wireless data streaming. This is clicking with attempts linking satellite communication to the networks on the ground, and including millimeter-wave (simply, mm-Wave) bands. Customers need their wireless devices portable with multiple functions as mentioned before. Antennas for the devices should be neither big nor heavy. For the purpose, low weight and frequency-diversity antenna is designed. It is devised to play the function of having two bands in the mm-wave frequency regime. The antenna is presented as follows..

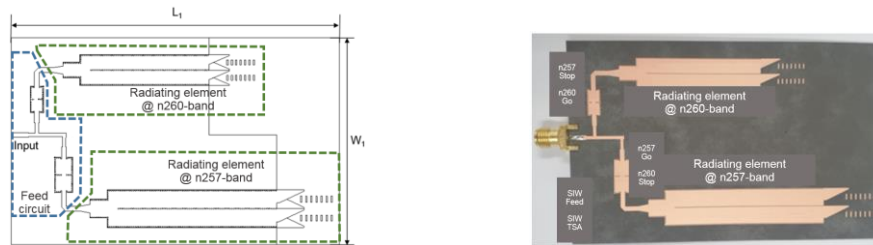


Figure 1. Planar antenna designed and manufactured to generate two mm-wave bands.

The proposed antenna comprises the planar radiating elements for different frequencies having an open aperture which are fed by a frequency splitter as shown in Figure 1. The structure as an SIW is easy to make using the etching process for microstrip structures as introduced in reference (J. D. Kraus and R. J. Marhefka, 'Antennas for all Application,' McGraw-Hill 2002). Its performances are obtained by the tests.

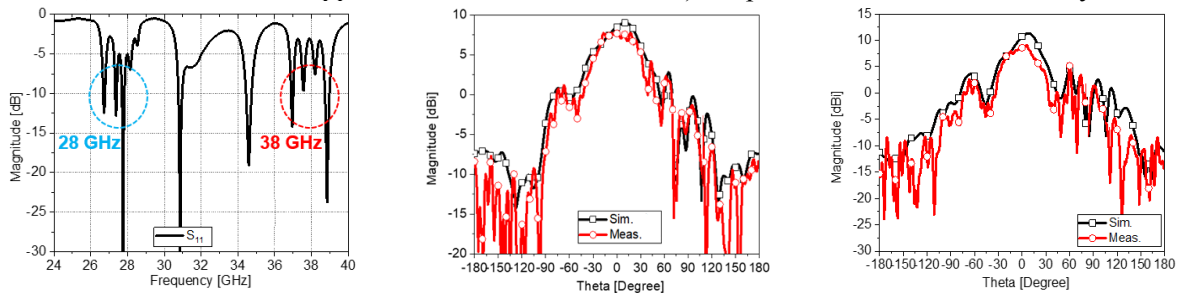


Figure 2. S_{11} at the input port and far-field patterns at the two mm-wave bands.

Generation of the two bands (28 GHz and 38 GHz) is checked with S_{11} . At each of the two frequencies, the far-fields are plotted as in Figure 2. The tests show a high directivity antenna with frequency-diversity as intended.

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