

High-gain planar horn antenna working at 60 and 77GHz.

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Low profile antennas' main advantage is clear: small volume that allows its embedding in walls, ceilings or other structures. The main drawback they have is the low directivity they usually present. However, as it was shown in (M. Beruete, IEEE Transactions On Antennas And Propagation, vol. 54, no. 2, 2006) employing a periodic perturbation at the output of a flat antenna, gives a travelling-wave antenna as a result, which reradiates with an enhanced directivity, lower side lobes and thinner beamwidth. This behavior can be related to that seen at optical wavelengths used in similar structures. Extraordinary transmission at microwave frequencies can also be explained in terms of leaky waves (V. Lomakin and E. Michielssen, Phys. Rev. B, Condens. Matter, vol. 71, no. 23, pp. 235117-1–235117-10, 2005.)

Here we present a flat dual band horn antenna with semi-periodic grooves. This structure improves the gain level seen at a simple planar antenna at both 60 and 77GHz. This dual-band operation is due to a longitudinal resonance, given by a central slit, and a transversal resonance given by the antenna's width. Figures below prove the enhancement achieved compared to a flat antenna.

A better response is obtained by giving revolution symmetry to the antenna, as shown in (M. Beruete, IEEE Antennas And Wireless Propagation Letters, vol. 4, 2005).

