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Title:Analysis and design of enhanced directivity microstrip antenna at terahertz frequency by using electromagnetic bandgap material
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Abstract: In this paper, an electromagnetic bandgap (EBG) material in the range of 0.5–0.8 THz has been simulated with Arlon AR 600 (ε=6.0) as host material and air-cylinders as the foreign embedded material. The effective dielectric permittivity of this material has been analyzed at the frequency range of 0.590–0.620 THz. The reduced effective dielectric permittivity substrate of thickness 50 μm has been used to design the microstrip antenna at 600 GHz with a novel approach. This proposed antenna shows an enhanced directivity of 15.1 dBi at 600 GHz frequency. To compare the analysis, the operating frequency has been scaled down by a factor of 100 and various results have been compared by using two different commercially available simulators CST Microwave Studio based on the finite integral technique and Ansoft HFSS based on the finite element method. 
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