

The effect of the metamaterial superstrate to the vertically stacked bandpass filter antenna performances

ABSTRACT

The integration of metamaterial superstrate with high-quality cavity 3-poles stacked filter with patch antenna is presented. The metamaterial inspired behavior is obtained using split ring resonators (SRR) printed on the dielectric substrate Rogers 5880 which is located 12 mm from the top of the filter/antenna. The effects of the metamaterial structure on the vertically stacked filter/antenna performances at X-band with resonant frequency 10.18 GHz are investigated. The gain of the filter/antenna system improved from 6.99 dB to 8.22 dB while the radiation pattern become more directive without distorting the filtering response.

Keyword: Meta material; Patch antenna; Rectangular waveguide; Substrate integrated waveguide; Vertically stacked filter