Spoof surface plasmon polaritons based notch filter for ultra-wideband microwave waveguide - DTU Orbit (09/11/2017)

Spoof surface plasmon polaritons based notch filter for ultra-wideband microwave waveguide

Spoof surface plasmon polaritons based notch filter for ultra-wideband microwave waveguide is proposed. Owing to subwavelength confinement, such a filter has advantage in the structure size without sacrificing the performance. The spoof SPP based notch is introduced to suppress the WLAN and satellite communication interference simultaneously. Both the cutoff frequency and the notch frequency are sensitive to the structure parameters, and the cut-off frequency can reach 20 GHz. An adiabatic transition relying on gradient hole-size and flaring ground is designed to effectively couple energy into spoof SPP waveguide. The result shows its cut-off frequency of 17.4 GHz with the insertion loss better than 3 dB during the whole pass-band, while having more than 20 dB rejections at 5.36 GHz and 9.32 GHz with 10 dB fractional bandwidth 1.07% and 0.74% respectively to avoid the existing WLAN and satellite communication signals. Due to planar structures proposed here, it is easy to integrate in the microwave integrated systems, which can play an important role in the microwave communication circuit and system.

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