

论文

一种用于60 GHz通信的S型结构左手材料的设计

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摘要:

基于对S型结构的理论分析,将中心频率设置为60 GHz,通过合理的改变单元结构中相应的尺寸以实现所需电谐振和磁谐振频率,并且经过优化以实现负介电常量和负磁导率的重合频段尽可能理想. 运用反演参量提取方法进行电磁参量提取,可以得到本设计在58.1~61.4 GHz频段内其 ϵ 和 μ 同时为负,即左手频段. 分析散射参量的仿真结果,在58~62 GHz频段内 S_{21} 大于-3 dB,在59.8~60.4 GHz频段内, S_{11} 小于-20 dB,因此该设计结果可以运用于60 GHz通信滤波器和天线等器件的研究与设计.

关键词: 左手材料 S型左手结构 60 GHz通信

A Kind of S-type Structure of Left-handed Materials for 60 GHz Communication

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Abstract:

The S-typed LHM is selected as design objective. The center frequency of S-typed structure is set as 60 GHz. By reasonably varying the corresponding parameters size of unit structure, the required electric resonance and magnetic resonance frequency can be obtained. Based on the theoretical analysis of S-typed structure, the coincidence frequency of negative permeability and permittivity can be optimized as possible as ideal. The dielectric constant of substrate can effect the characteristic and stability of LHM. In this paper, the dielectric constant is set as 2.2. The electromagnetic parameters are extracted using NRW method. The negative ϵ and negative μ index can be obtained in the band from 58.1 GHz to 61.4 GHz which is proved as left-hand band. From the simulation results of scattering parameters, it can be observed that the S_{21} values are greater than -3 dB with the frequency range from 58 GHz to 62 GHz and the S_{11} values are less than -20 dB with the frequency range of 59.8~60.4 GHz. Therefore, the results can be referred as the design of filter and antenna for 60 GHz communication.

Keywords: Left-handed metamaterial S-typed structure 60 GHz communication

收稿日期 2012-10-09 修回日期 2012-11-26 网络版发布日期

DOI: 10.3788/gzxb20134204.0423

基金项目:


江西省科技支撑项目(No.20121BBE50028);江西省自然科学基金(No.20122BAB201027)和江西师范大学省光电子与通信重点实验室开放基金资助

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