

Design and Implementation of Dual-Band Bandpass Filter using Tapped E Shaped Dual Mode Open Loop Resonator

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Abstract

In the Bandpass filter two open stepped impedance resonator is introduced with help of dual band pass filter. The proposed filter having an extra added two open stubbed impedance resonator inside the substrate and the filter design is designed for input output transmission lines where structure is totally coupled. Through this theoretical analysis and full wave simulation, we proceed SLR is ready to have the beneficial that odd mode resonant frequency and perhaps even mode are fixed. Dual bandpass filter is a simulated design of microwave dual bandpass filter is operating at its centre frequencies (1.75, 2.83) GHz which make this filter liable candidate of dual Bandpass filter. The insertion loss less than -5dB. An s-parameter result proposed filter has been simulated correctly which shows remarkable characteristics of microwave dual bandpass filter using SISRs. A dual bandpass filter is design to the dual part wireless communication. Wireless network IEEE802.11b operates at 2.4 GHz. Satellite communications 2.31 to 2.36 GHz. The FR4 substrate by dielectric constant 4.4 thickness 1.6 mm and loss tangent 0.02 in the prepared filter structure which based at SISR the dual band filter.

Keywords- Dual Bandpass Filter, Dual E-Shaped Multimode Resonator, Coupling Model, Geometrical and Physical Parameters

I. INTRODUCTION

This bandpass filter is of two path network, which recommend the disapproval frequency component from input port to Output port. One or more desire frequencies is refer like band-pass filter. A bandpass filter part for wireless message.[6]A microwave filter are mostly desire in latest dual-band pass filter the wireless communication system. Now many type of method is being report the designated [1-7] dual-band filters (BPF). A[1]Multi-layer freely controlled dual bandpass filter. To decrease Circuit size two E-shaped multimode resonators has been to design dual band pass filter.[2] By using stub loaded resonator a Dual band gives control by central loaded open stubs. By [7] using stubs impedance resonators (SIRs) by many resonant mode dual band filter are mostly design. [5]The number of the Configuration and menology has been performed to realize this filter this filter in the past with two separate pass band. Complexity in design, large, high insertion loss is the filter Have number of disadvantages. A pass-band with sharp between a very dual pass-band by separating the pass band into two small passband to realize a dual Bandpass filter. On the other hand, covers large circuit area. In the recent years to make dual BPF the stepped impedance resonators are commonly used.[3] In the structure to design of SIR tunable resonance frequency by just adjusting the parameter band pass filter. To make and realize the technique of dual-band operation. The impedance ratio and total electrical length of SIR on easily the harmonics resonance frequency. The central frequency of these two band are controlled simultaneously. [4]The two feed lines is Used the impedance transformer. On the other this Progressive Approach gives large size and complexity to design. This prepared paper the micro strip dual bandpass filter is design and two cascades stepped impedance resonators and add to extra open stub load inside the design. A device or machine to the simulated result of Dual Bandpass filter is operating centre Frequencies 1.75 GHz as well as 2.83 GHz. Filter applications is designed and measured in the proposed model of dual band Pass filter. Wireless network IEEE802.11b operates 2.4GHzSatellite communication 2.31 to 2.36 GHz.

II. DESCRIPTION AND DESIGN DUAL BANDPASS FILTER

The prepared filter structure is used ADS simulation tools. A Propose filter is the two open stub resonators to composed -With two loaded stub resonators. All length of each resonators is around to wavelength $[(\lambda_g)/2]$. Figure 1 the physical layout of dual band pass filter use to uniform micro strip line. The prepared filter structure is based on SISR a dual -band Filter has been design on a substrate with a FR4 dielectric constant 4.4, thickness 1.6 mm and loss tangent 0.02. The both side parallel coupled microstrip feed structure is used between feed lines and corresponding SIRs. A dual bandpass filters design and two cascade stepped impedance resonators and add extra open stub load inside the design A device or machine to the simulated result of Dual Bandpass filter is operating frequencies at 1.75 GHz and as well as 2.83 GHz. . The two pass band return loss 22.79 and 20 dB. A

prepared filter insertion loss is -0.097 and -0.889 dB. A dual bandpass filter is design to the dual part wireless Communication .Warless network IEEE802.11b operates at 2.4 GHz. Satellite communications 2.31 to 2.36 GHz. The parameter design of proposed filter is follows.

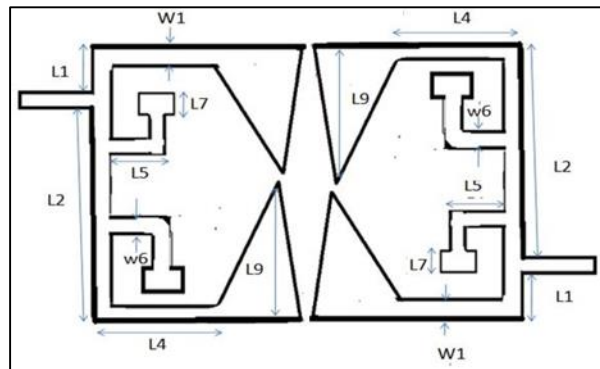


Fig. 1: Dual bandpass filter layout

Table 1: Layout dimension in mm

L1	2.8	L9	6.2
L2	10.6	W1	0.5
L3	11	W2	0.52
L4	5	W3	0.45
L5	3.74	W4	2.05
L6	3.65	W5	0.5
L7	1.15	W6	0.45
L8	2.35	W7	0.35

Table 2: Dual bandpass filter specification design

Parameter	Value
Centre Frequency f_1	1.75 GHz
Centre Frequency f_2	2.83 GHz
Return Loss S_{11}	22.79 dB
Return Loss S_{11}	20 dB
Insertion Loss S_{21}	-0.69 & -0.88 dB

III. DUAL BANDPASS FILTER SIMULATION RESULTS

The simulated result figure 2 the dual bandpass filter Proposed paper .Dual bandpass filter paper operates Frequencies are 1.75 GHz as well as 2.83 GHz in the Simulated machine or device. The return loss in more than -10dB .The two pass band return loss 22.79 and 20 dB is first And second band pass filter. The proposed filter intension loss Is -0.097dB and -0.08897.The FR4 substrate by Dielectric constant 4.4 thickness 1.6 mm in the prepared filter Structure which based at SISR the dual band filter. The Insertion loss less than -5 dB .In this proposed paper a Bandpass filter for dual-band Bandpass filter is introduce with the help of open stepped impedance resonator. The dual-band bandpass filter is design for warless application. The L band Are used to radio spectrum 1 to 2 GHz and satellite, mobile Services, telecommunication application.

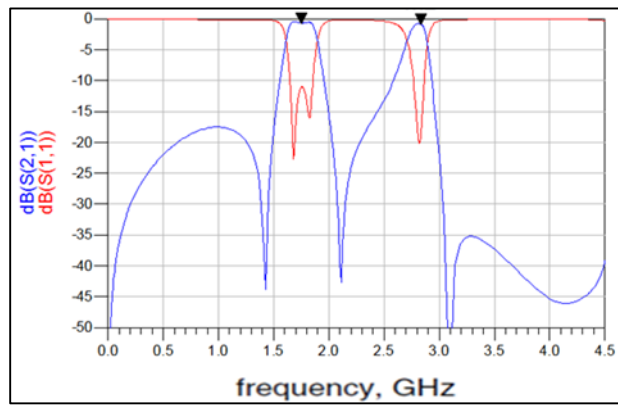


Fig. 2: S11, S21 Dual-band bandpass filter simulated result

IV. THE BANDPASS FILTER FABRICATED RESULTS

A prepared filter with using stepped impedance resonators is fabricated to the substrate with a FR4 dielectric constant 4.4 thicknesses 1.6 mm and loss tangent 0.02. The figure shown fabricated band pass filter using SISRs. These are two pass band of prepared filter is located frequency 1.75 GHz and 2.83 GHz. The prepared filter is fabricated have dimension is similar to the dual band pass filter is designed in simulated filter.

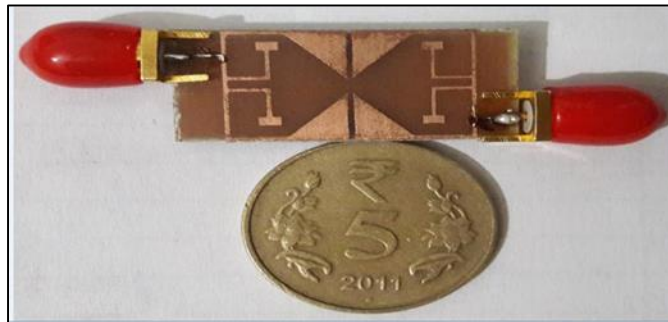


Fig. 3: Dual bandpass filter fabricated image layout

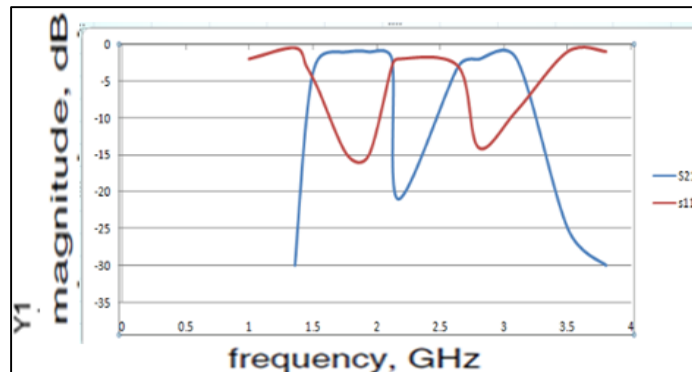


Fig. 3 (a): VNA data result of proposed filter design

Table 3: The comparison between simulated result and measured result is tabled below

Sl. No.	Parameter	Simulated Result	Measured Result
1	Material	FR4 / 4.4	FR4 / 4.4
2	Loss Tangent	0.02	0.02
3	Centre Frequency	1.75/2.83 GHz	1.85/2.88GHz
4	Return Loss	22.79/20 dB	17/14 dB
5	Insertion Loss	0.69/0.88 dB	1/1.5 dB

Table 4: Comparison of Results dual-band bandpass filter

Parameters	Reported Results [1]	Reported Results [8]	Proposed Work
Centre Frequencies	1.84/2.65 GHz	1.84/2.9 GHz	1.75/ 2.83 GHz
Return Loss	13.4/15.5 dB	15.5/24 dB	22.79/ 20 dB
Insertion Loss	0.81/0.95 dB	0.75/0.90 dB	0.69 / 0.88 dB
Fractional Bandwidth	21/5.66%	10.86/8.6 %	22/7.09 %
Size (mm ²) excluding	17 X 21	18 X 22	15 X 20

V. CONCLUSION

The prepared paper a dual Bandpass filter SIRs is propose has dual- band performance 1.75 GHz and 2.83GHz .The Insertion loss less than -5 dB. The better response is found the simulated and measurement result. In this proposed paper a Bandpass filter for dual Bandpass filter is introduce with the help of open stepped impedance resonator. The return loss in more than -10db . The two pass band return loss 22.79 and 20 dB is first and second band pass filter .The proposed filter Intersion loss is -0.97 dB and 0.88 dB.

The dual-band bandpass filter is design for wireless application. They consider to industry requirement size to be always in the improved. Much type of techniques is used to improve the characteristics of filter. There are size of filter to reduced using minizutarton techniques i.e. size can be reduced dual-band bandpass filter.

Open loop stepped impedance resonators an example of this Work direction. The design and result in improved the dual-band bandpass filter. They are challenging further work studying this technology. The filter size to reduces and return loss, insertion loss improve. The fabrication and measurement of filter and lab measurement to be performances filter.

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