



UWB Bandpass Filters with Sharp Rejection using Folded Defected Ground Structure



By

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North Bangkok
Thailand





UWB Bandpass Filter With Improved Rejection Band Performance using Defected Ground Structure and Slotted Step Impedance Resonator



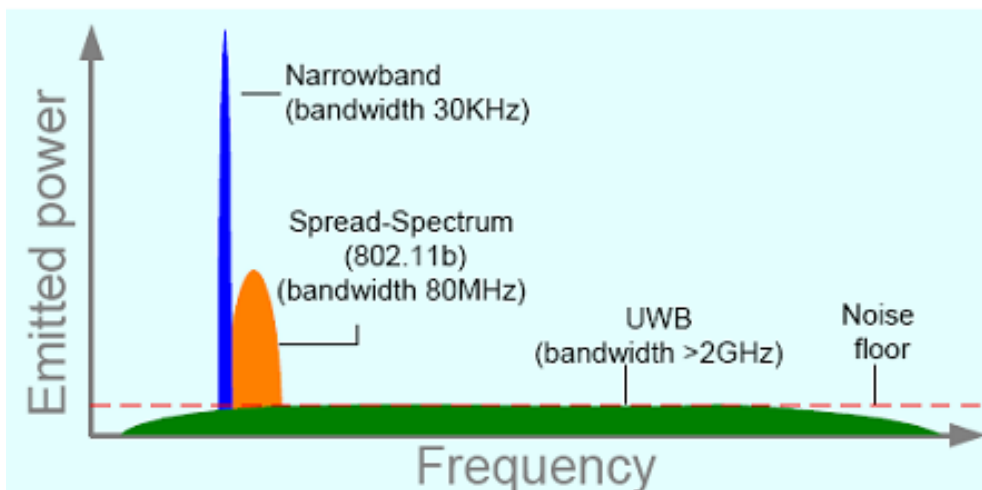
Out Line

1. Introduction
2. Filter Design
3. Simulated and Measured Results
4. Conclusions



1. Introduction

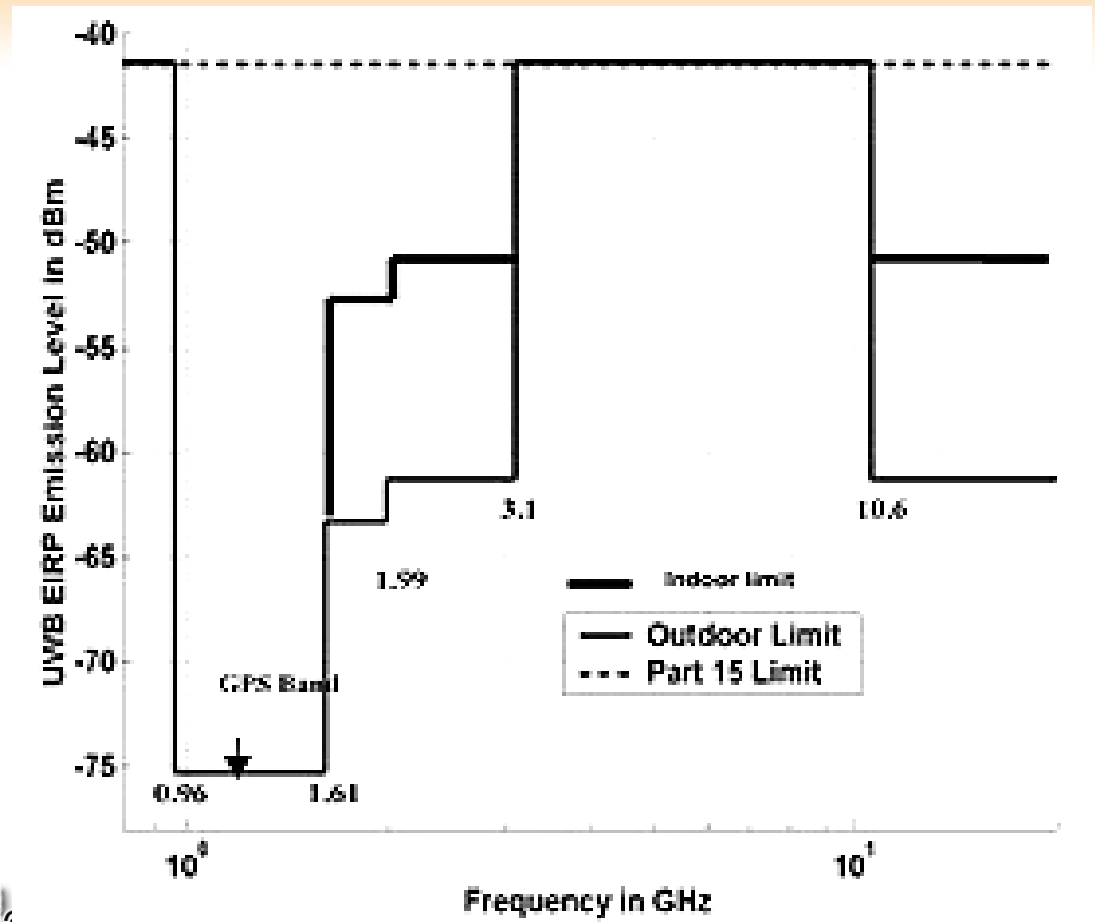
- **Ultra-wideband (UWB)** is a radio technology that can be used at very **low energy levels** for **short-range high-bandwidth** (>500 MHz) communications by using a large portion of the radio spectrum.



System	Transmission Power [W]	Bandwidth [Hz]
Radio	50 kW	75 kHz
TV	100 kW	6 MHz
GSM-900	320 W	200 kHz
GSM-1800	20 W	200 kHz
WCDMA	20 W	5 MHz
WLAN	1 W	20 MHz
UWB	1 mW	7.5 GHz



UWB Mask (UWB Emission Limits)





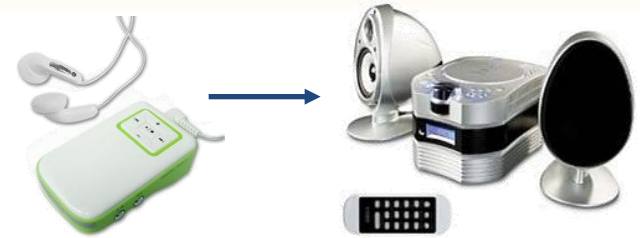
1. Introduction



Video Streaming



Print Files



MP3 File Transfers



Movie Transfers



Disk Backup



Camera Downloads



1. Introduction

Requirement of Research

- Low loss
- Compact size
- High suppression of spurious responses
- Improved stopband performances
- Sharp Rejection



1. Introduction

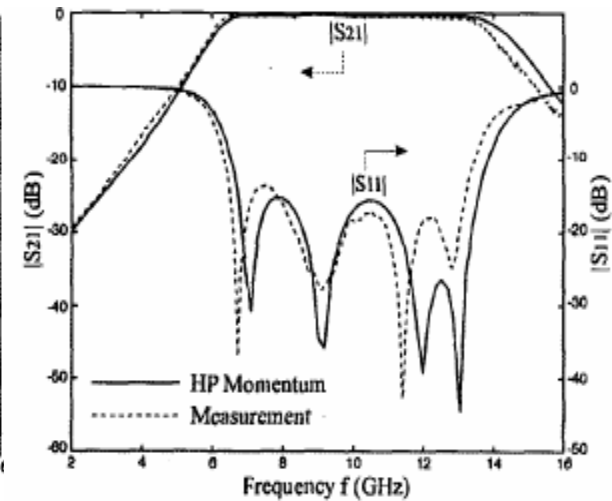
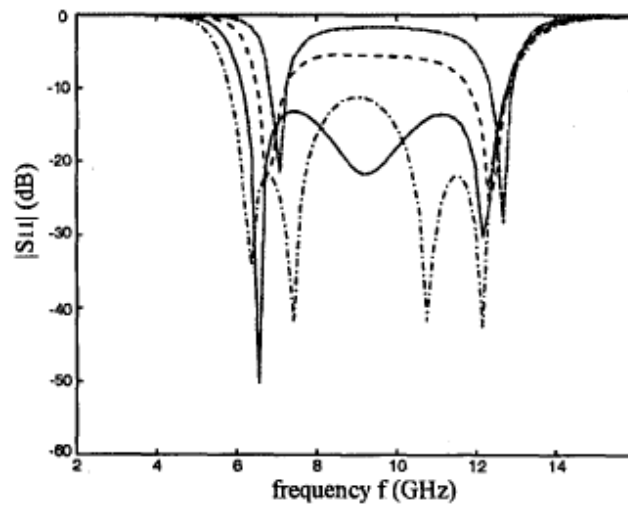
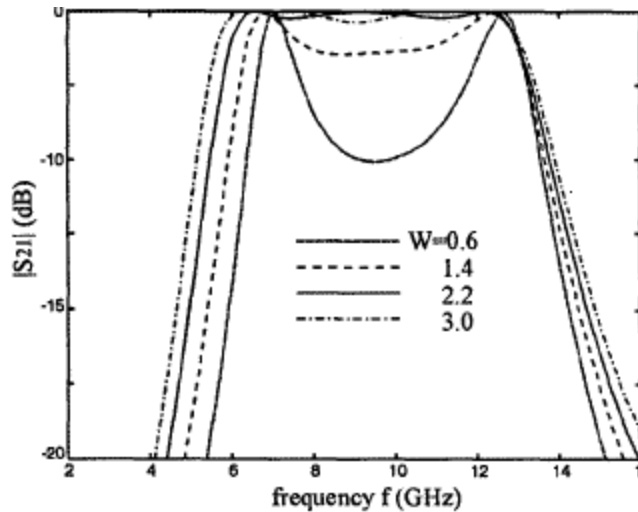
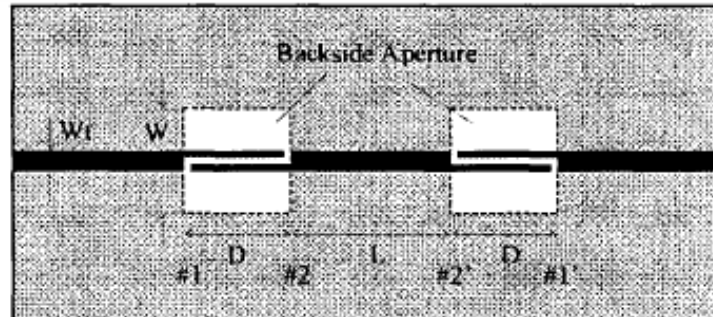
APERTURE COMPENSATION TECHNIQUE FOR INNOVATIVE DESIGN OF ULTRA-BROADBAND MICROSTRIP BANDPASS FILTER

Lei Zhu, Huuheng Bu, and Ke Wu



0-7803-5687-X/00/\$10.00 © 2000 IEEE

2000 IEEE MTT-S Digest





1. Introduction

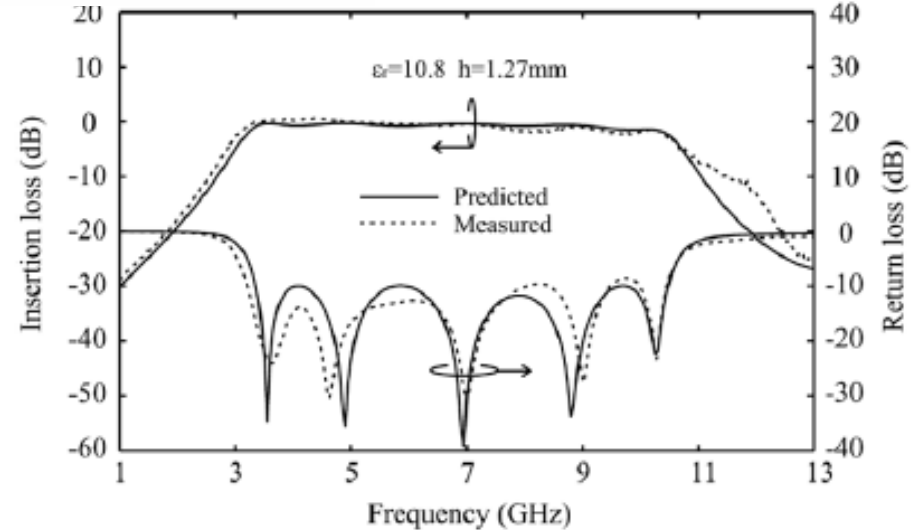
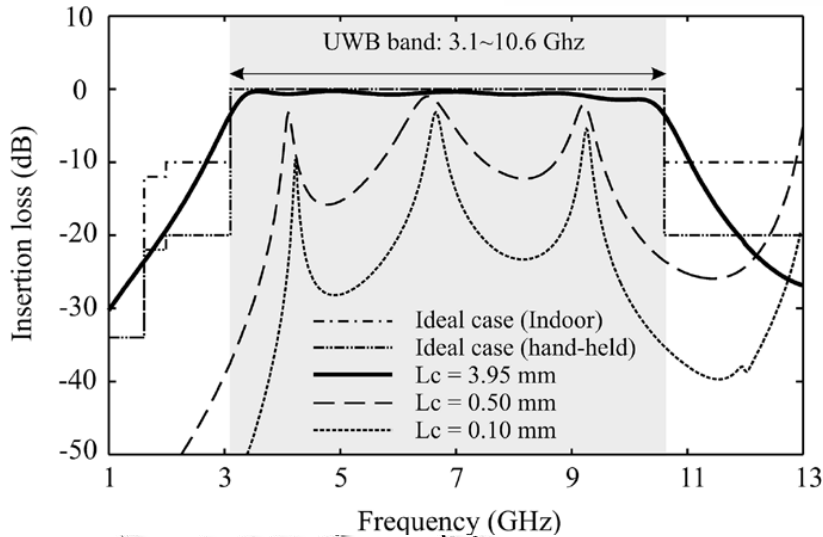
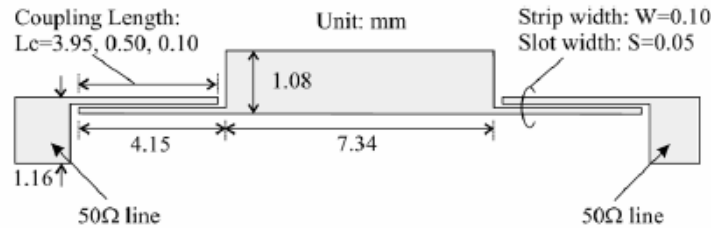
Ultra-Wideband (UWB) Bandpass Filters

Using Multiple-Mode Resonator



Lei Zhu, *Senior Member, IEEE*, Sheng Sun, *Student Member, IEEE* and Wolfgang Menzel, *Fellow, IEEE*

IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS, VOL. 15, NO. 11, NOVEMBER 2005





1. Introduction



Ultra-Wideband (UWB) Bandpass Filters with Improved Upper-Stopband Performance

Sai Wai Wong, Sheng Sun, Lei Zhu*

Proceedings of Asia-Pacific Microwave Conference 2006 Copyright 2006 IEICE



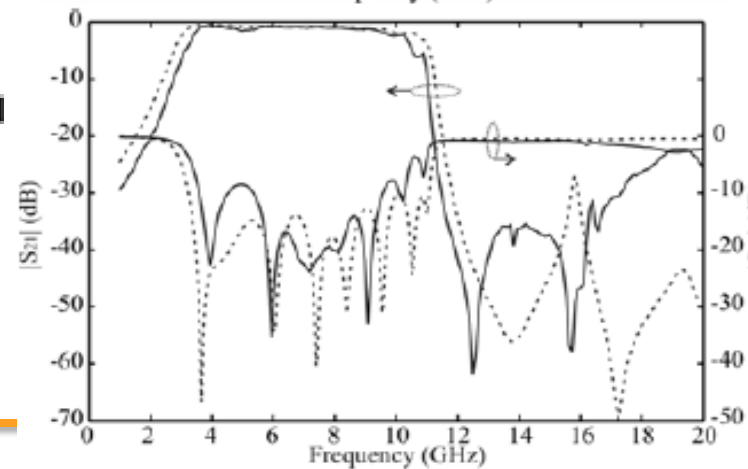
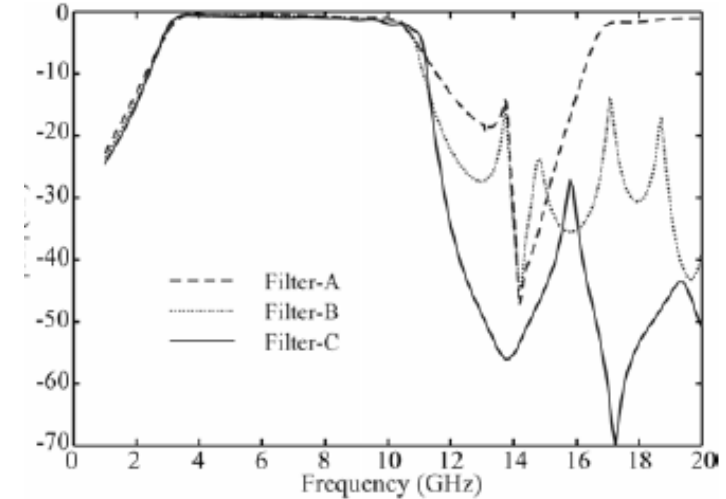
(a)



(b)



(c)





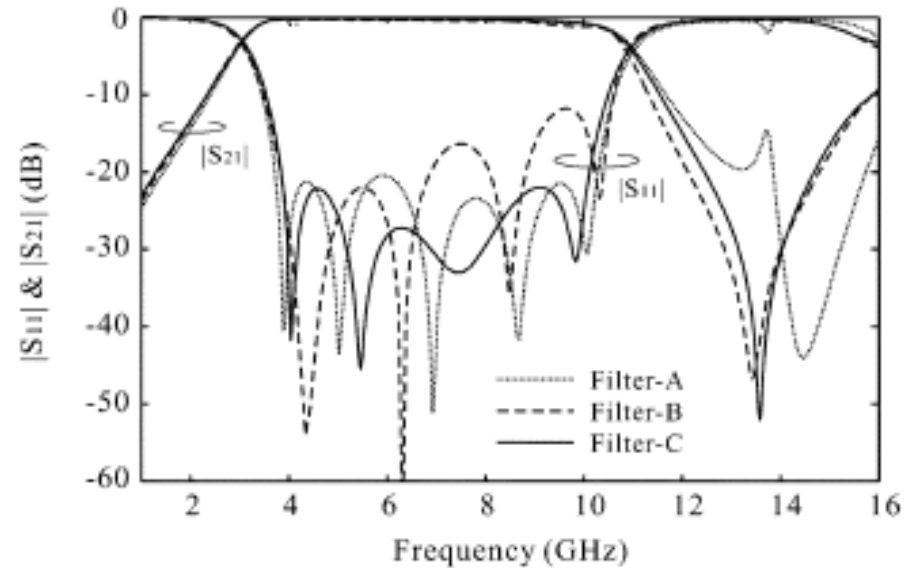
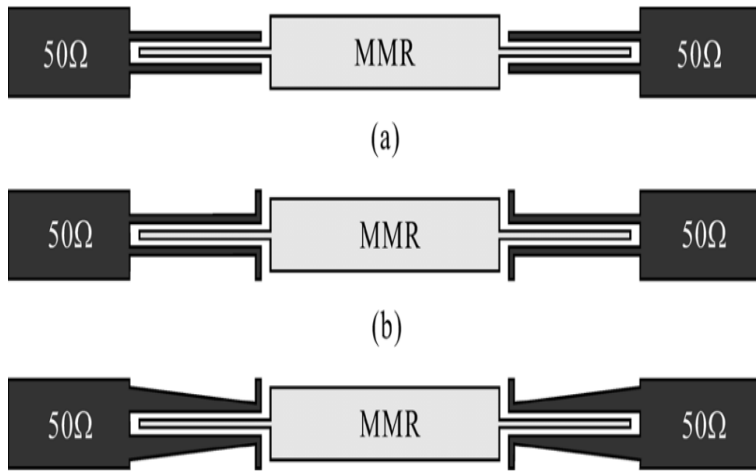
1. Introduction

Capacitive-Ended Interdigital Coupled Lines for UWB Bandpass Filters With Improved Out-of-Band Performances



Sheng Sun, *Student Member, IEEE*, and Lei Zhu, *Senior Member, IEEE*

IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS, VOL. 16, NO. 8, AUGUST 2006





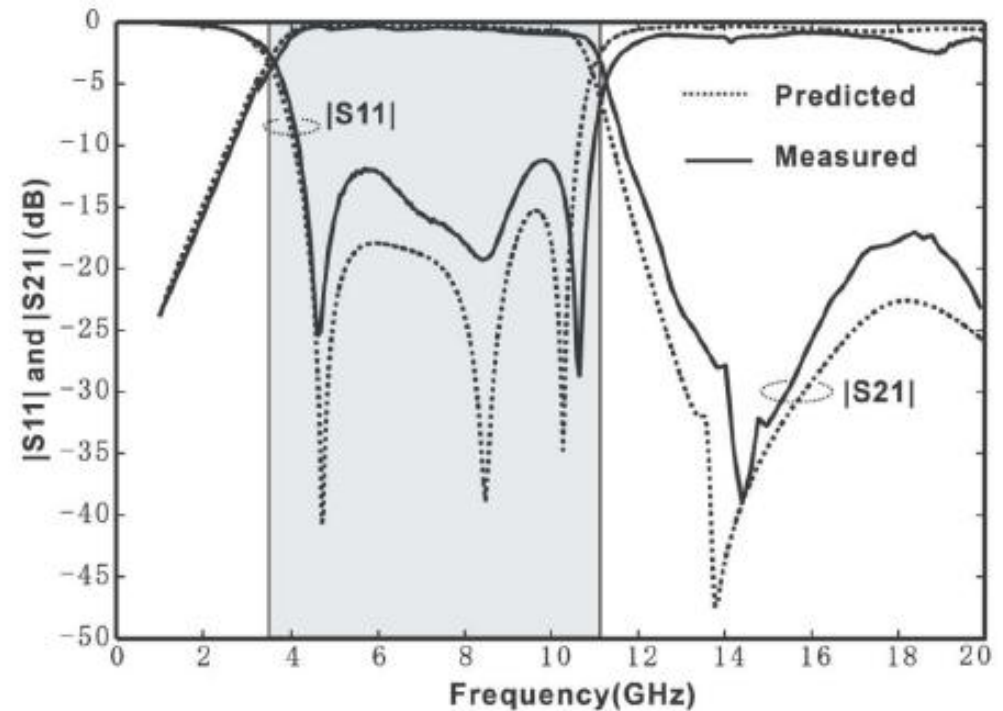
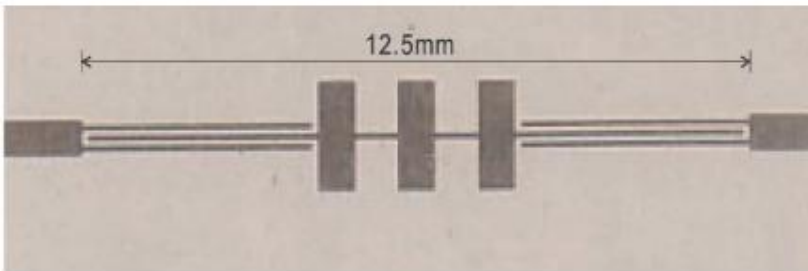
1. Introduction

EBG-Embedded Multiple-Mode Resonator for UWB Bandpass Filter With Improved Upper-Stopband Performance



Sai Wai Wong and Lei Zhu, *Senior Member, IEEE*

IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS, VOL. 17, NO. 6, JUNE 2007





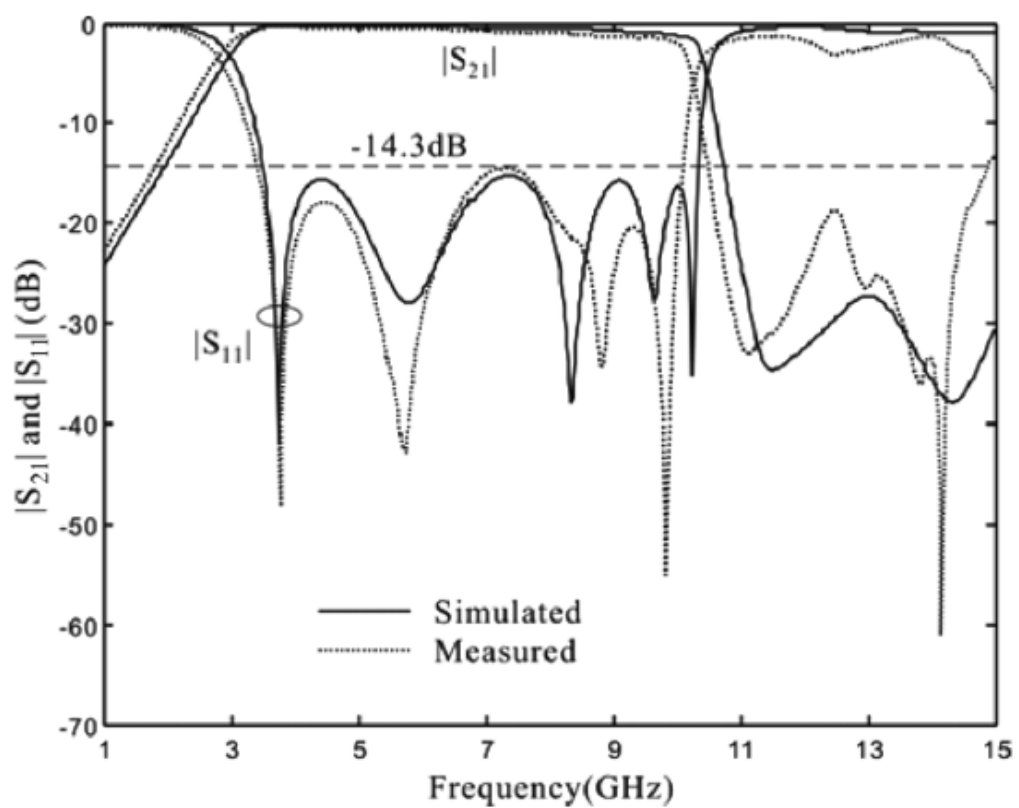
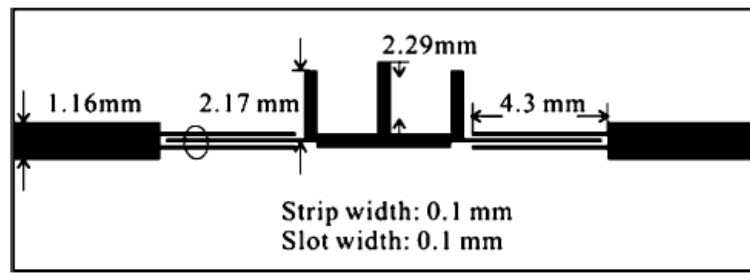
1.Introduction

Compact UWB Bandpass Filter Using Stub-Loaded Multiple-Mode Resonator



Rui Li, *Student Member, IEEE*, and Lei Zhu, *Senior Member, IEEE*

IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS, VOL. 17, NO. 1, JANUARY 2007





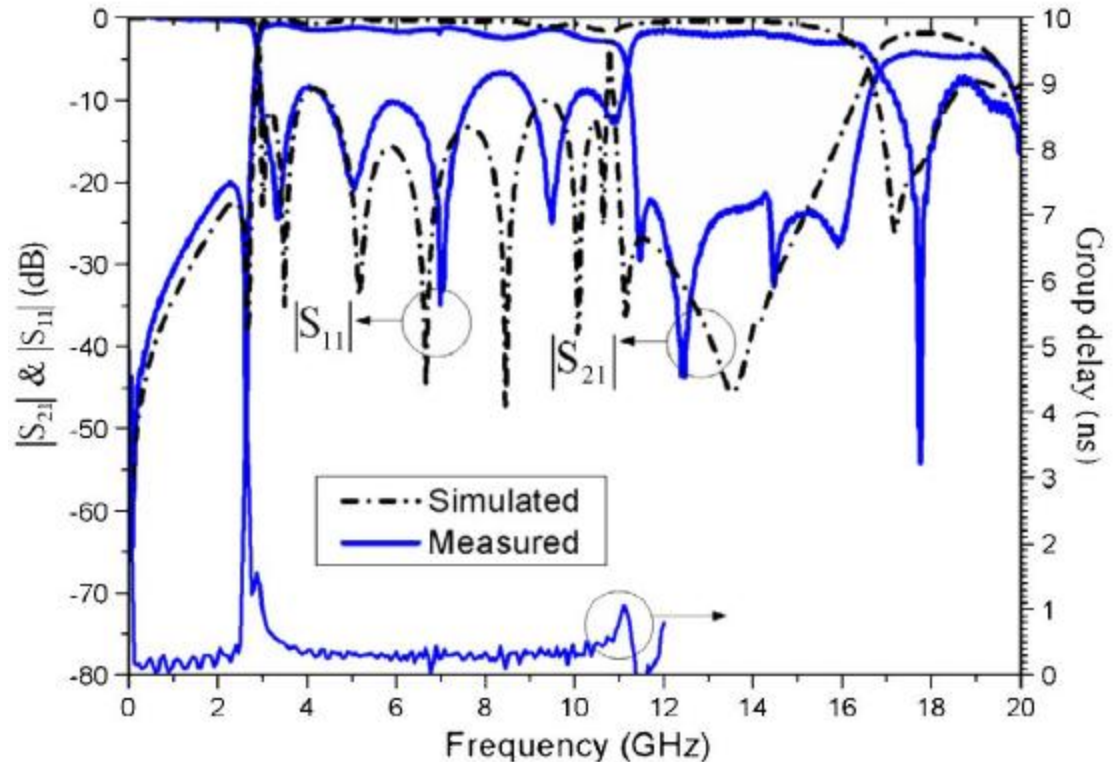
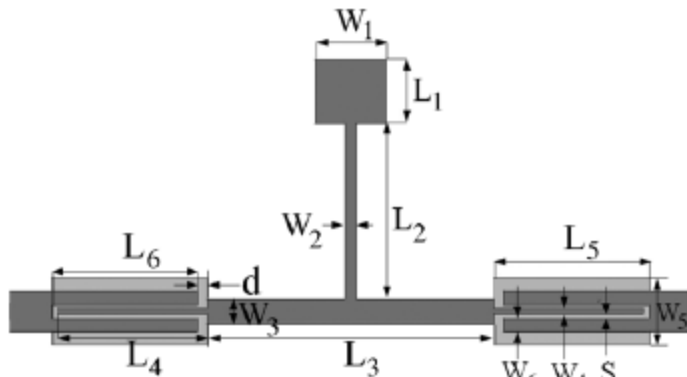
1. Introduction

Design of UWB Bandpass Filter Using Stepped-Impedance Stub-Loaded Resonator

Qing-Xin Chu, *Member, IEEE*, and Xu-Kun Tian



IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS, VOL. 20, NO. 9, SEPTEMBER 2010





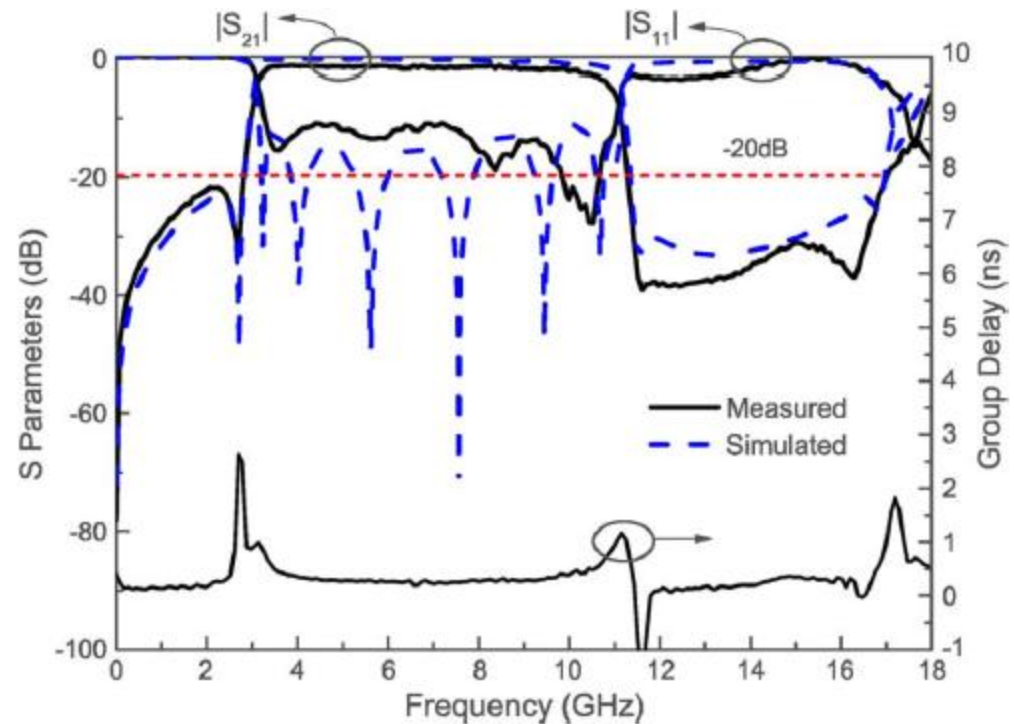
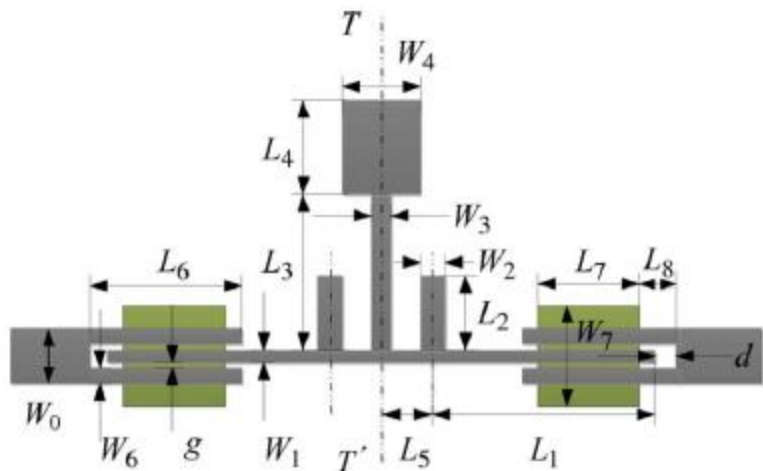
1. Introduction

Novel UWB Bandpass Filter Using Stub-Loaded Multiple-Mode Resonator



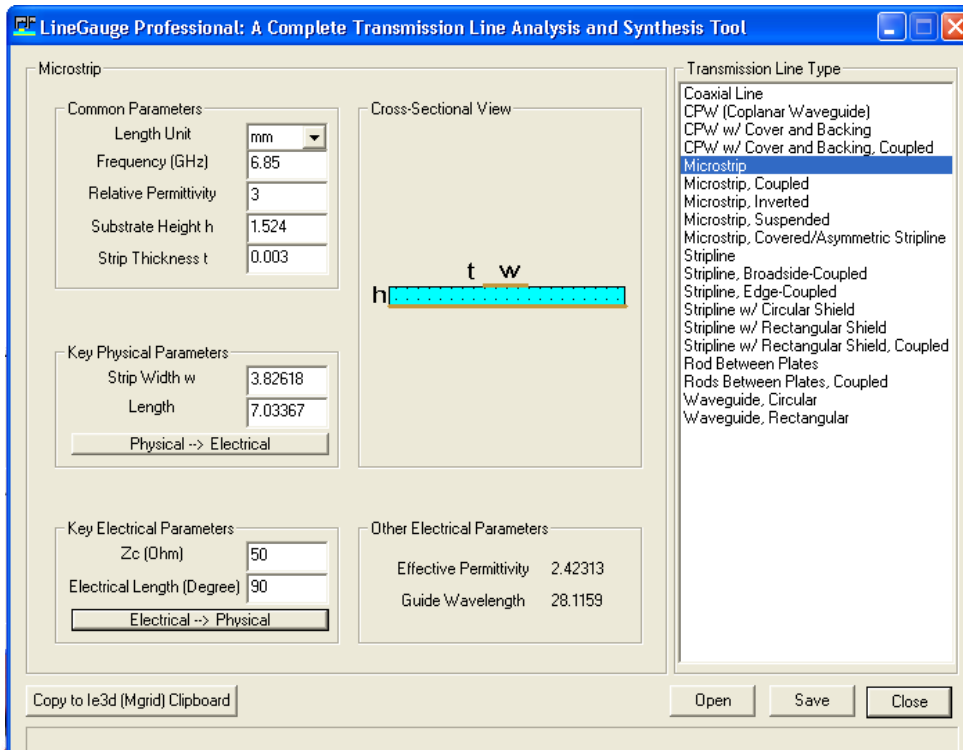
Qing-Xin Chu, *Member, IEEE*, Xiao-Hu Wu, and Xu-Kun Tian

IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS, VOL. 21, NO. 8, AUGUST 2011





2.Filter Design

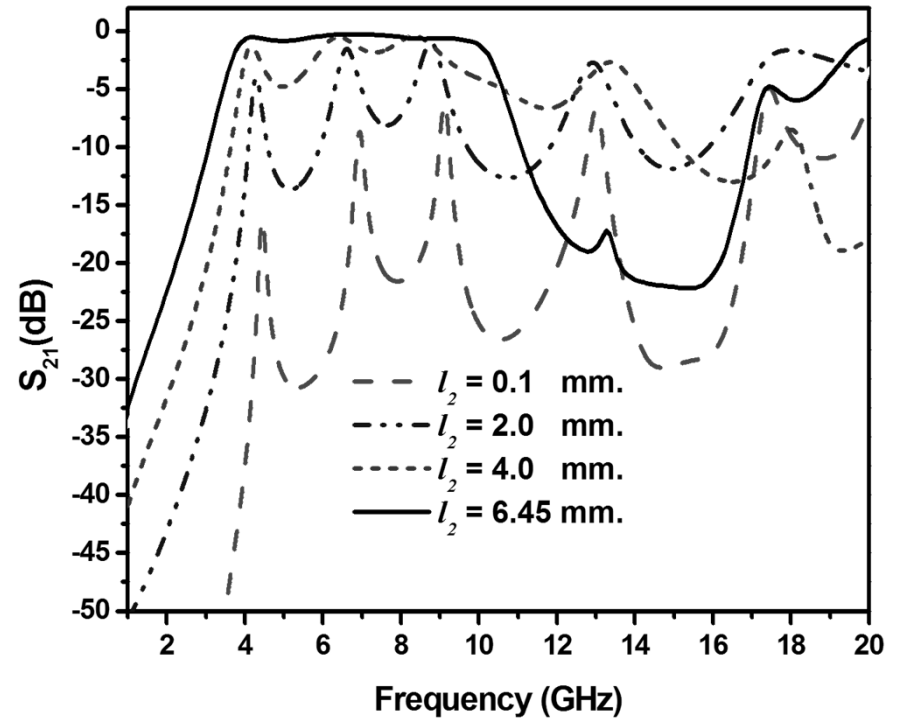
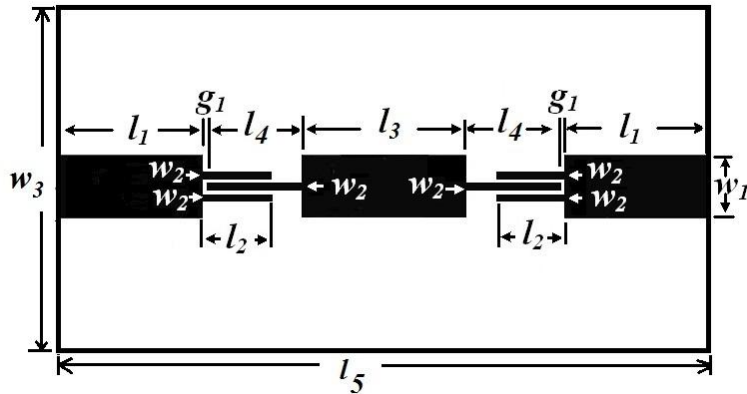


- RT/Duroid 3003 substrate
- dielectric constant of 3.0
- thickness of 1.524 mm
- IE3D program



2.Filter Design

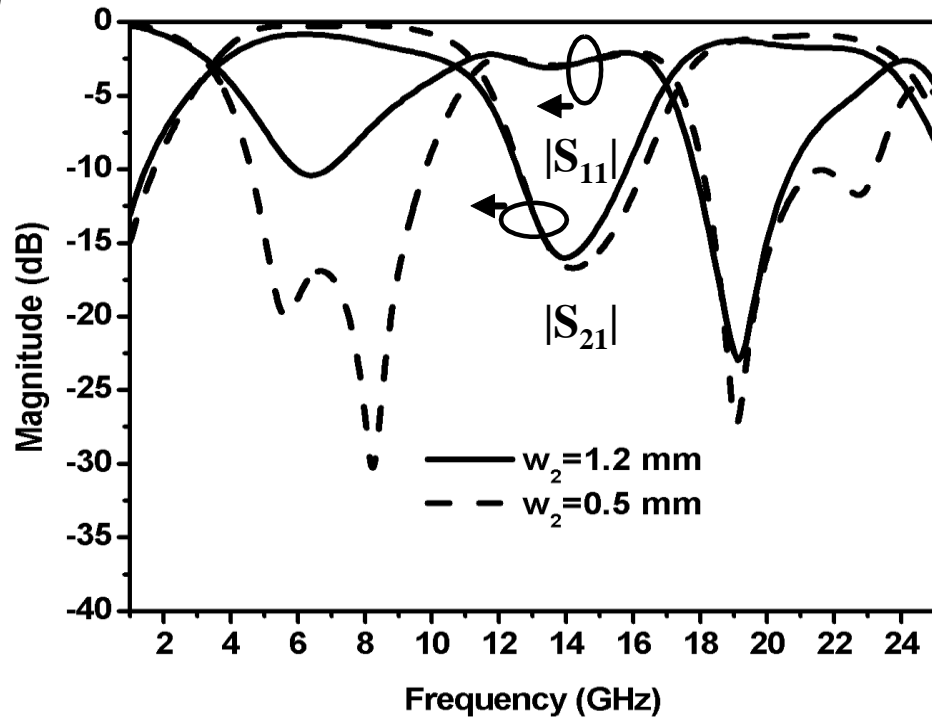
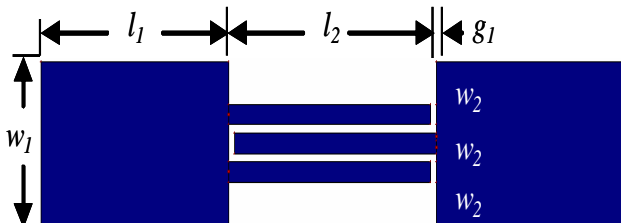
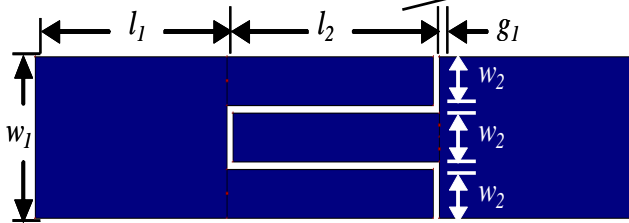
UWB Banpass Filter Characteristics





2. Filter Design

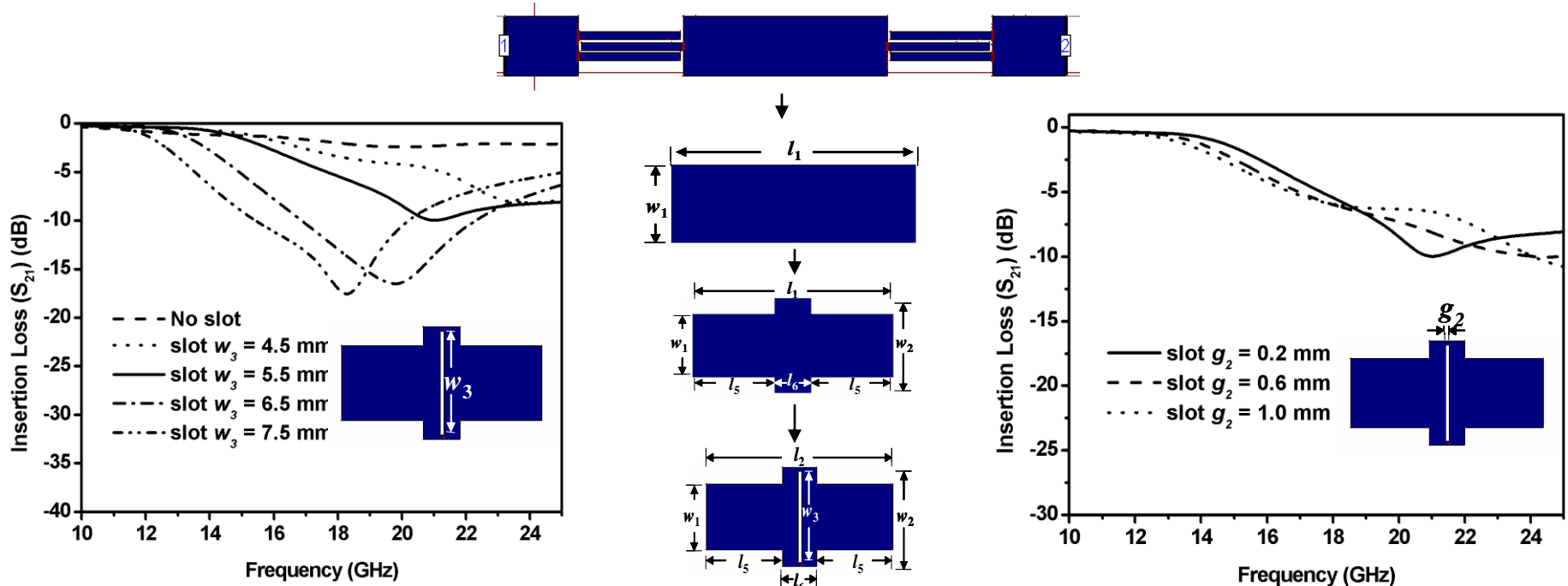
Interdigital Coupled Line Characteristics





2.Filter Design

SSIR Bandstop Characteristics



Bandstop responses (S_{21})

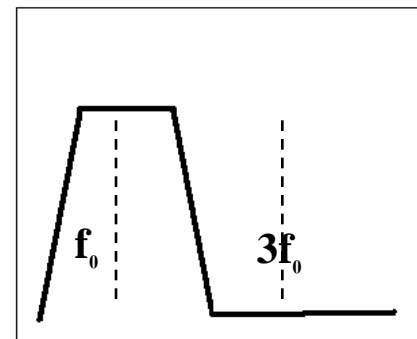
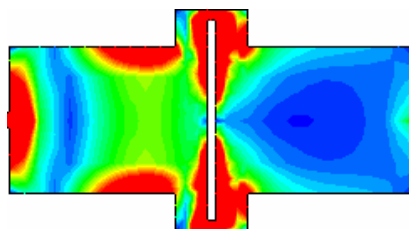
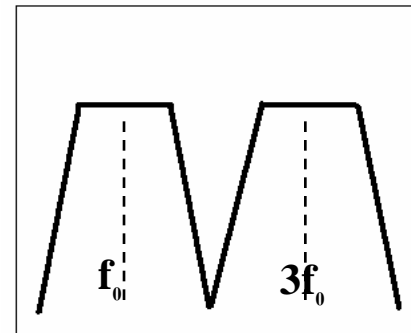
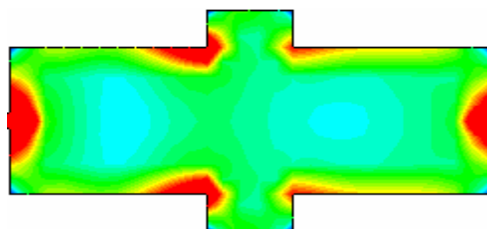
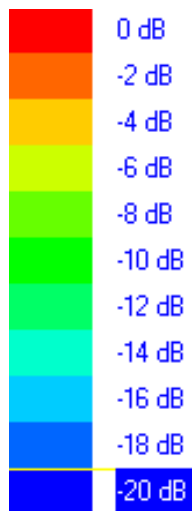


Bandstop responses (S_{21})



2.Filter Design

Current Distributions



Bandstop responses (S21)



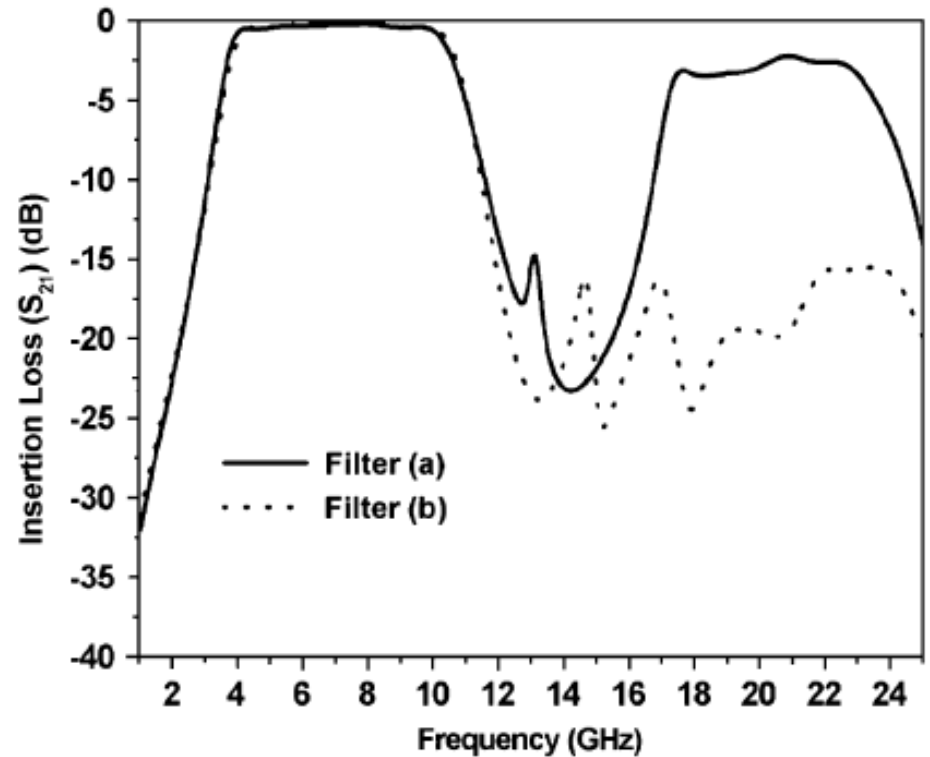
2. Filter Design



Filter (a)



Filter (b)

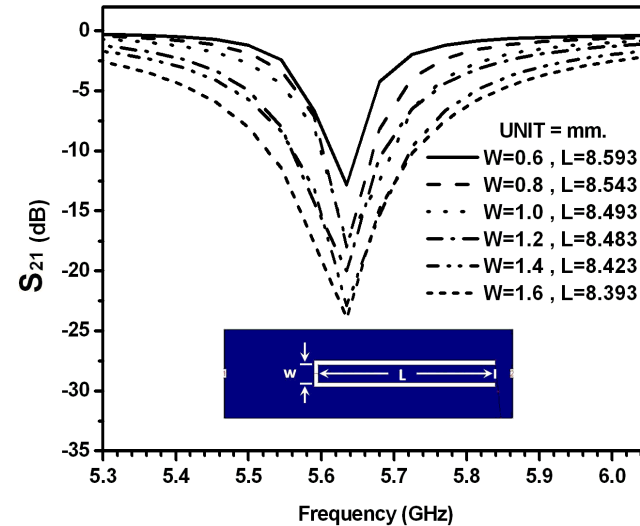
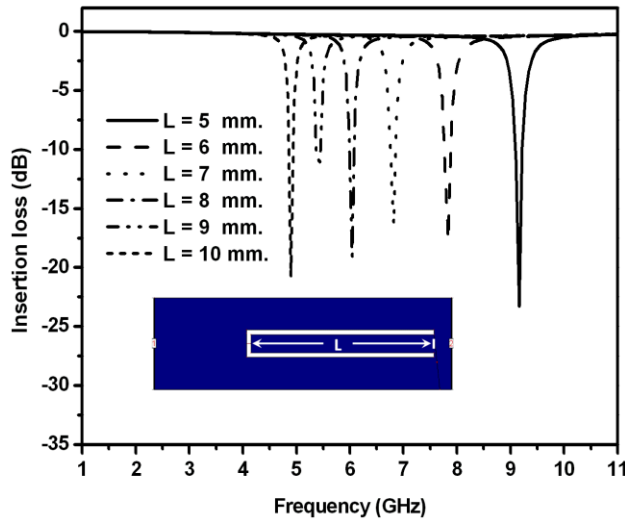


Bandstop responses (S_{21})



2.Filter Design

Bandstop Characteristics

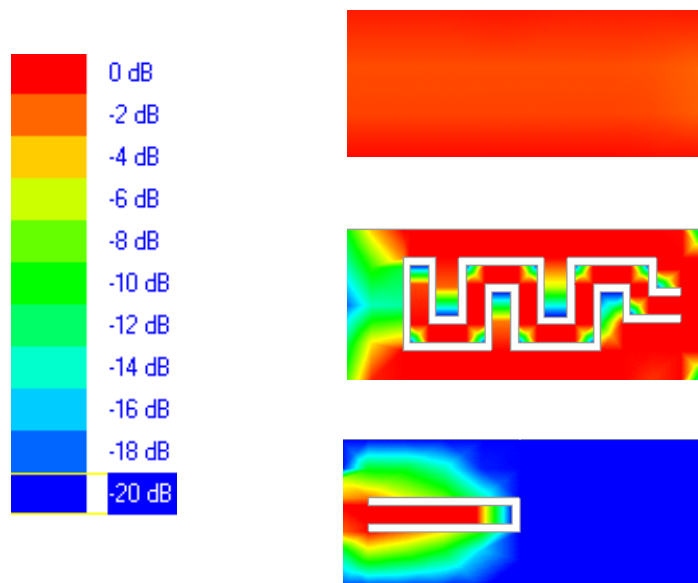


Bandstop responses (S_{21})



2.Filter Design

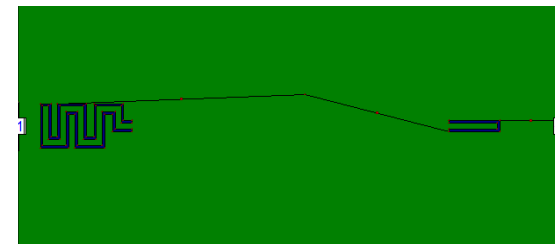
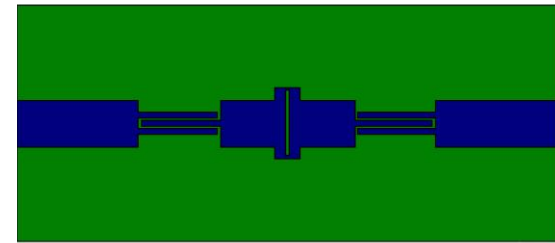
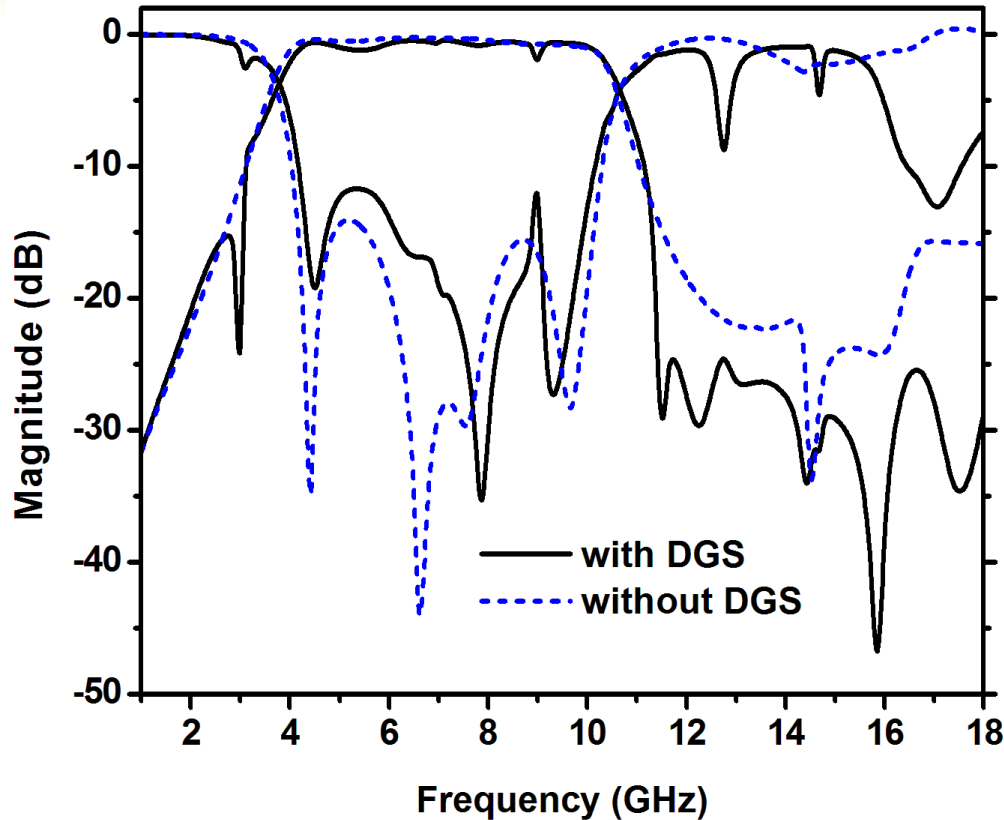
Current Distributions





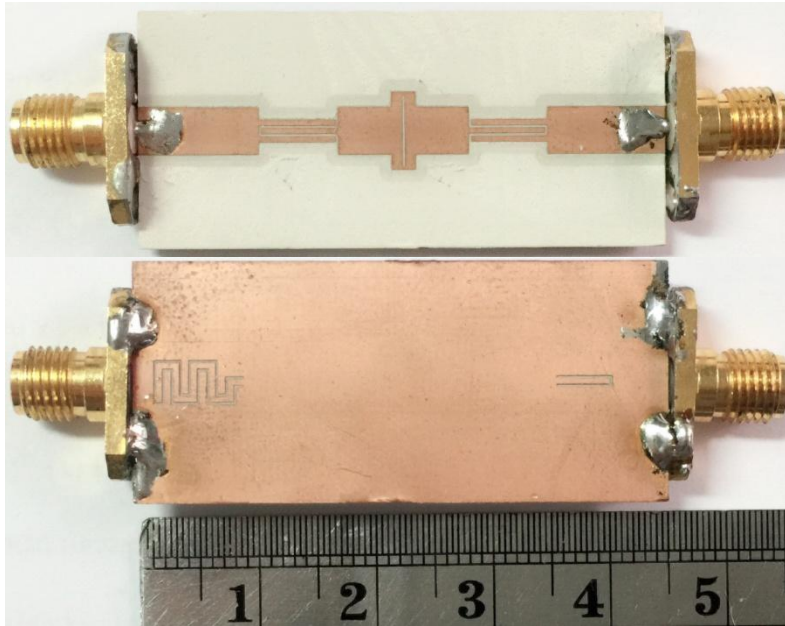
2.Filter Design

Simulation

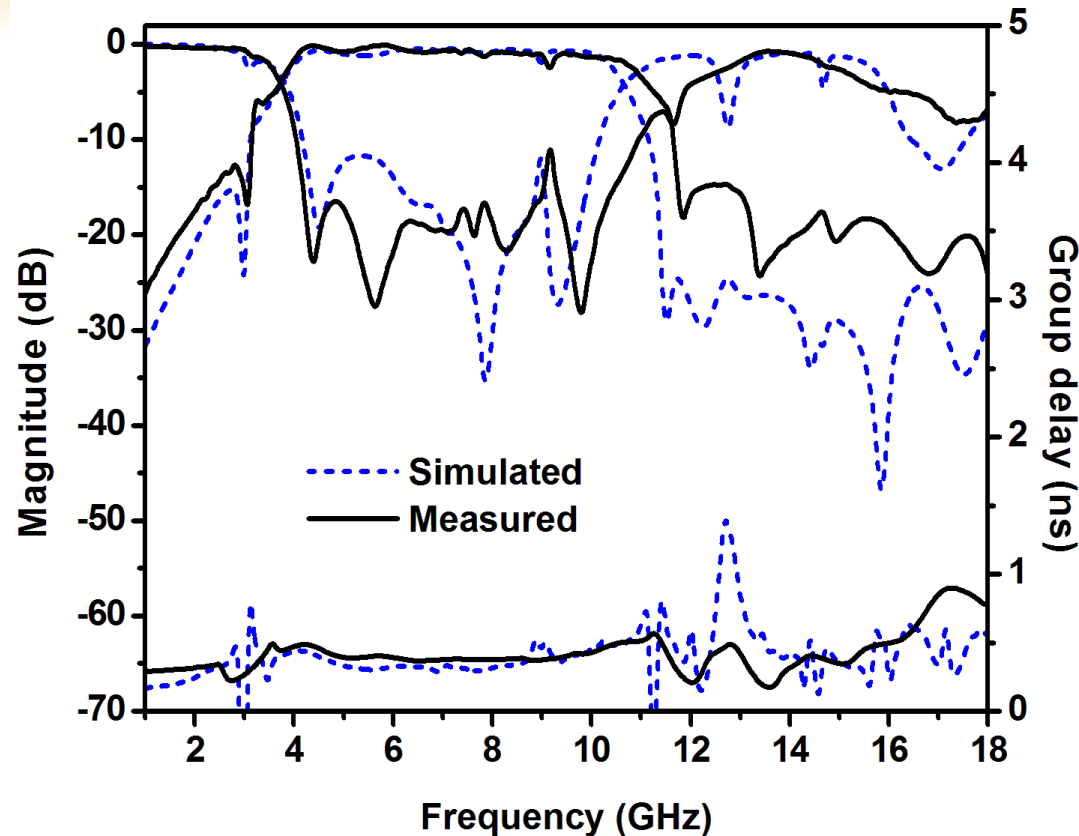




3. Simulated and Measured Results



Photograph of the fabricated filter



Measured and simulated responses



4. Conclusions



- Simple Design
- Improve passband
- Improve lower/upper stopband performances
- Widened upper stopband
- Sharp rejection



Thank You
for
Your Attention
& Question