Analysis, Design and Development of a Low Cross Polarization Level Ultra-Wideband Absorber using Resistive Metasurfaces

A THESIS SUBMITTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF

DOCTOR OF PHILOSOPHY

BY

SAURABH KUMAR SRIVASTAVA

DEPARTMENT OF ELECTRONICS ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY
(BANARAS HINDU UNIVERSITY)
VARANASI-221005, INDIA

Roll No. 17091008 ***2023***

CERTIFICATE

It is certified that the work contained in the thesis entitled ***" Analysis, Design and Development of a Low Cross Polarization Level Ultra-Wideband Absorber using Resistive Metasurfaces"*** *by Mr. Saurabh Kumar Srivastava has been carried out under my supervision and this work has not been submitted elsewhere for a degree.*

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20/12/2023

Prof. Manoj Kumar Meshram
Supervisor
Department of Electronics Engineering
IIT(BHU), Varanasi

प्राचार्य/Professor
इलेक्ट्रॉनिकी अभियांत्रिकी विभाग
Department of Electronics Engineering
भारतीय प्रौद्योगिकी संस्थान
Indian Institute of Technology
(बनारस हिन्दू यूनिवर्सिटी)
(Banaras Hindu University)
वाराणसी/Varanasi-221005

CANDIDATE'S DECLARATION

I hereby declare that the work presented in the dissertation entitled ***" Analysis, Design and Development of a Low Cross Polarization Level Ultra-Wideband Absorber using Resistive Metasurfaces"*** *is an authentic record of my own work carried out at the Department of Electronics Engineering, Indian Institute of Technology (Banaras Hindu University), Varanasi as the requirement for the award of the degree of Doctor of philosophy in Electronics Engineering, submitted in the Indian Institute of Technology (Banaras Hindu University), Varanasi for the session 2023-24 under the supervision of* ***Prof. Manoj Kumar Meshram (Supervisior)****, Department of Electronics Engineering, Indian Institute of Technology (Banaras Hindu University), Varanasi.*

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Saurabh Km 20/12/23

Mr. Saurabh Kumar Srivastava
Roll No. 17091008
Department of Electronics Engineering,
IIT(BHU), Varanasi

CERTIFICATE BY THE SUPERVISOR

It is certified that the above statement made by the student is correct to the best of our knowledge.

20/12/2023

(Prof. Manoj Kumar Meshram)
Supervisor
Department of Electronics Engineering
IIT(BHU), Varanasi

प्राचार्य/Professor
इलेक्ट्रॉनिकी अभियांत्रिकी विभाग
Department of Electronics Engineering
भारतीय प्रौद्योगिकी संस्थान
Indian Institute of Technology
(बनारस हिन्दू यूनिवर्सिटी)
(Banaras Hindu University)
वाराणसी/Varanasi-221005

20/12/2023

(Prof. Manoj Kumar Meshram)
Head of the Department
Department of Electronics Engineering
IIT(BHU), Varanasi

आचार्य व विभागाध्यक्ष/PROFESSOR & HEAD
इलेक्ट्रानिकी अभियांत्रिकी विभाग/Department of Electronics Engineering
भारतीय प्रौद्योगिकी संस्थान (का.हि.वि.)/Indian Institute of Technology (BHU)
वाराणसी/Varanasi-221005 (INDIA)

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Acknowledgment

I would like to express my deepest thanks and gratefulness to those who directly or indirectly assisted me in accomplishing the work presented in this dissertation.

First and foremost, I extend sincere thanks and gratitude to my supervisor, Prof. Manoj Kumar Meshram sir, for his kindness, support, discussions, continuous upliftment, and encouragement throughout the research journey, shaping this work from its initial stages.

I must acknowledge and thank Prof. S. P. Singh for his in-depth technical and practical discussions and valuable time.

I am extremely grateful to my RPEC members, Prof. Devender Singh and Dr. Somak Bhattacharyya, for their valuable suggestions during the evolution of this research.

I extend my gratitude to my colleague Rahul Dubey and my junior Akanksha Singh for their technical discussions and memorable moments that made this journey fruitful. Additionally, I thank all my lab mates and friends: Dr. B. Satyanaryana, Dr. Arun Kumar Saurabh, Ravi Mali, Ajitesh, Rajkumar Jatav, Sweta Agarwal, Praveen Singh Rathore. I would also like to express my thanks to my technical staff, Jay Ram, for their support.

Finally, I express my deepest thanks to my parents-my mother and father who sacrificed their own happiness to help me achieve my dream and reach this stage of life. I also express my love and gratitude to my beloved wife Pooja Srivastava, who single-handedly took care of me and our beloved son Prasann at the cost of her own academic career and happiness. I am truly blessed, and extend thanks to my brother, Shashank Kumar Srivastava, and my sister, Akanksha Srivastava, for their unwavering support throughout this journey. I would like to express my love to my grandmother Kumudni Srivastava, Late grandfather Adya Prasad Srivastava, and my Late maternal grandfather, Girja Shankar Srivastava, for their kind belive in my potential.

I must acknowledge the support of my friend Saurabh Tiwari, Lokesh Gupta, Ashutosh Dikshit, Surya Pratap Singh, Sumit Yadav, Sumit Kumar, and Gundu Venkatesh during the challenging days of this successful journey.

Lastly, I owe a deep gratitude to Lord Vishwanth, Goddess Saraswati, and my spiritual guru Sri Sri Ravishankar ji, who completed me and granted everything I desired in this holy city of Varanasi.

saurabh km

Date : 20.12.2023 **Saurabh Kumar Srivastava**

Dedicated to…

My beloved Parents

&

My son Prasann

Chapter wise Figure Index

Chapter 1
Introduction & Literature review

Chapter 2

Challenges in the Design of Ultra-Wideband Absorber: Misinterpretation of Reflective Polarization Converter as Wideband Absorber

Chapter 3

Low Radar Cross Section Conformal Ultra-Wideband Absorber

Chapter 4

Low Profile Conformal Ultra-Wideband Absorber

List of Tables

Abbreviations and Symbols (In order of their appearance)

S. No	Abbreviations and Symbols	Full Name
1.	EM	Electromagnetic
2.	HARP	Halpern Anti-Radar Paint
3.	RCS	Radar Cross Section
4.	2D	Two-Dimensional
5.	THz	Terahertz
6.	RAM	Radiation Absorbing Material
7.	EMI	Electromagnetic Interference
8.	EMC	Electromagnetic Compatibility
9.	EEH	Electromagnetic Energy Harvesting
10.	WPT	Wireless Power Transfer
11.	TL	Transmission Line
12.	ε_r	Relative Permittivity
13.	FSS	Frequency Selective Surface
14.	CA	Circuit Analog
15.	η_o	Free Space Impedance
16.	μ	Permeability
17.	SRR	Split Ring Resonator
18.	ERR	Electric Ring Resonator
19.	CPRC	Cross-Polarized Reflected Component

20.	MTM	Metamaterial
21.	θ	Oblique Incident Angle
22.	φ	Polarization Angle
23.	TE	Transverse Electric
24.	TM	Transverse Magnetic
25.	DSSR	Double Split-Serration-Ring
26.	PCR	Polarization Conversion Ratio
27.	HPC	High-Performance Computing
28.	tan δ	Loss Tangent
29.	c	Speed of Light
30.	SPAR	Sinusoidal Periphery Annular Ring
31.	θ_{el}	Electrical Lengths
32.	TLM	Transmission Line Model
33.	PMI	Poly-Methacrylimide
34.	SMD	Surface Mount Device
35.	ε_{eff}	Effective Permittivity Of Metasurface Within Stratified

Contents

Chapter 1: Introduction & Literature review

Chapter 2: Challenges in the Design of Ultra-Wideband Absorber: Misinterpretation of Reflective Polarization Converter as Wideband Absorber

Chapter 3: Low Radar Cross Section Conformal Ultra-Wideband Absorber

Chapter 5: Conclusion and Future Scope

References

Publications