(SSE-21/12/256/1)- DESIGN AND ANALYSIS OF POLARIZATION RECONFIGURABLE ANTENNA FOR REFLECTION COEFFICIENT AT 2.4GHz AND COMPARE WITH AND WITHOUT SLOT

PICO:

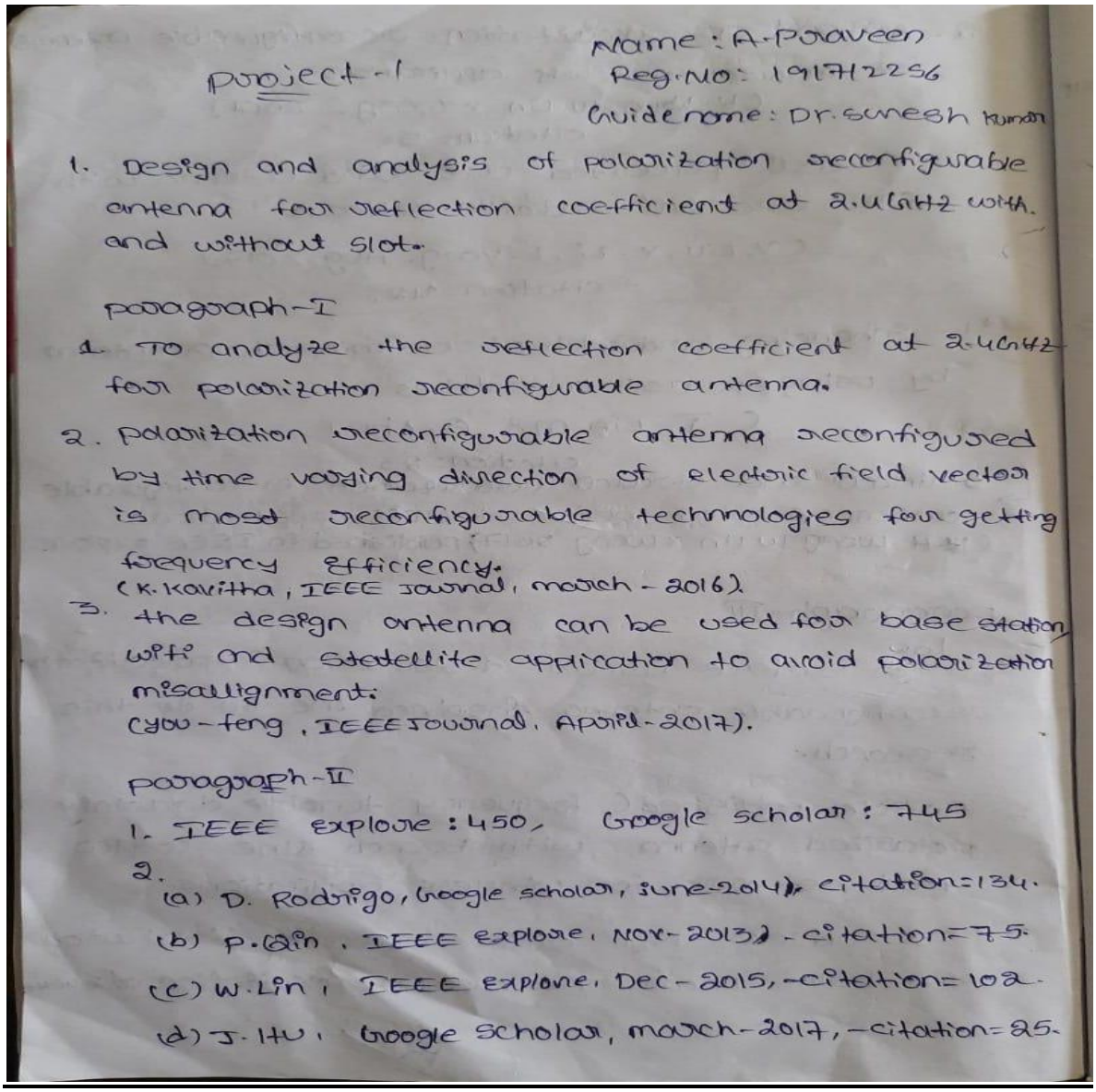
Problem: Switchable slots are incorporated into patches on using diodes

Intervention: a simple low profile slot creation

Comparison: Reflection coefficient of with and without slot

Outcome: Frequency vs Reflection coefficient(with and without slot)

INTRODUCTION:



Project-1

Name : A. Praveen
Reg. NO : 191712256
Guide name : Dr. Suresh Kumar

1. Design and analysis of polarization reconfigurable antenna for reflection coefficient at 2.4GHz with and without slot.

paragraph-I

1. To analyze the reflection coefficient at 2.4GHz for polarization reconfigurable antenna.
2. polarization reconfigurable antenna reconfigured by time varying direction of electric field vector is most reconfigurable technologies for getting frequency efficiency.
(K. Kavitha, IEEE Journal, march - 2016)
3. the design antenna can be used for base station, wifi and stetellite application to avoid polarization misallignment:
(you - feng, IEEE Journal, April - 2017).

paragraph-II

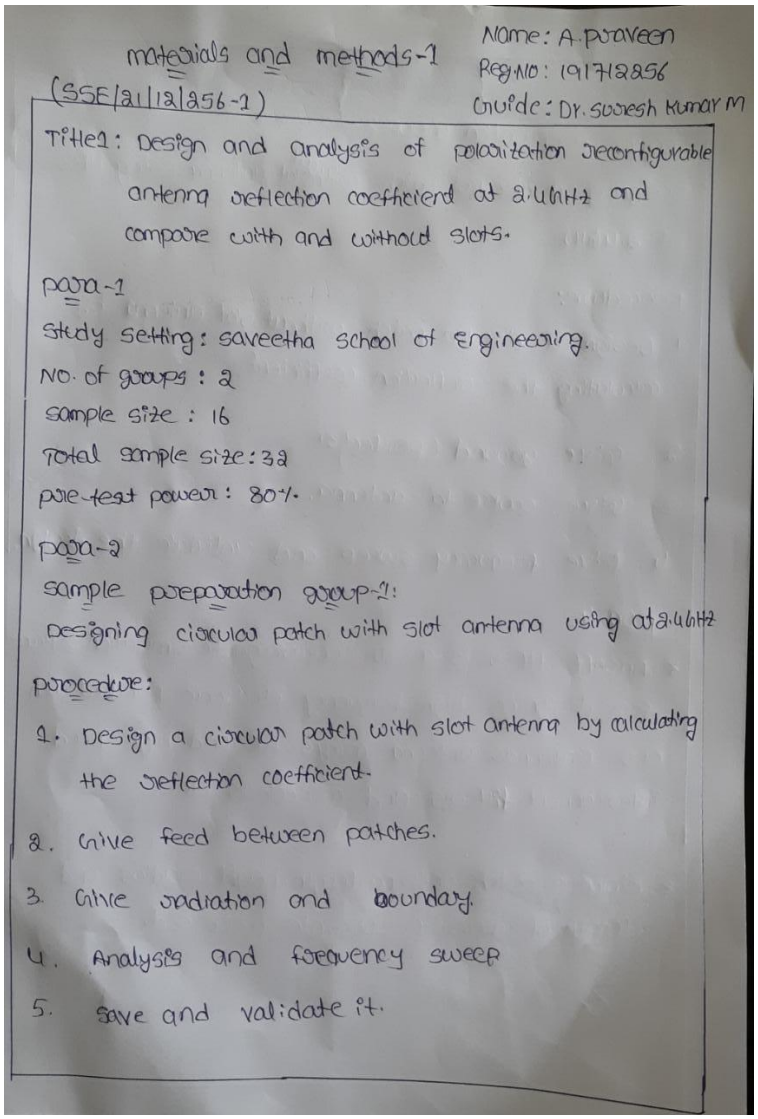
1. IEEE Explore : 450, Google scholar : 745
2. (a) D. Rodrigo, Google scholar, June-2014), citation=134.
(b) P. Qin, IEEE Explore, NOV-2013) - citation=75.
(c) W. Lin, IEEE Explore, Dec-2015, -citation=102.
(d) J. Hu, Google Scholar, march-2017, -citation=25.

3. W.Lin, IEEE Explore, Dec-2015 - It is the best citation

paragraph-III

1. The polarization (linear and circular) misalignment and less reflection coefficient.
2. Author: Dr. suresh kumar
   title; wideband frequency agile and polarization reconfigurable antenna for wireless application.
   year: 2021
3. To achieve polarization with good reflection cieficient at 2.4GHz (in 50Ω impedence matching)

MATERIALS AND METHODS



Materials and methods-1

Name: A. praveen
Reg.No: 191712256
Guide: Dr. Suresh Kumar M

(SSE/21/12/256-1)

Title1: Design and analysis of polarization reconfigurable antenna reflection coefficient at 2.4GHz and compare with and without slots.

para-1

Study setting: saveetha school of Engineering.

No. of groups : 2

sample size : 16

Total sample size: 32

pre-test power : 80%.

para-2

sample preparation group-1:

Designing circular patch with slot antenna using at 2.4GHz

procedure:

1. Design a circular patch with slot antenna by calculating the reflection coefficient.
2. Give feed between patches.
3. Give radiation and boundary.
4. Analysis and frequency sweep
5. Save and validate it.

para-3

sample preparation group-2:

Designing a circular patch without slot antenna using HFSS at 2.4GHz

procedure:

1. Design a circular patch without slot antenna by calculating the reflection coefficient.
2. Give ground (perfect E)
3. Give source to antenna.
4. Give frequency sweep and validate the design.

para-4:

* Ansoft HFSS is a 3D electromagnetic simulation software for designing high frequency electronic product such as antennas, antenna arrays, RF and high-speed interconnect, filters and connectors etc.

* circular patch antenna length, height, radius and length of dielectric substrate were set.

Testing procedure:

* Assign dielectric material and foreguency.
* calculating the length and width of patch using. microstaip test line calculator.
* Assign boundary conditions.
* Assign excitation.
* Assign analysis setup
* Validating design.
* Result analysis.

para-5:

Data collection: Data entered in excel.

para-6:

Statistical software used:

* HFSS software used for simulation and verification.
* ORIGIN PRO Vg.0 software.
* spss

Independent variable:

* foreguency (HHz).
* Di-electric constant.
* Di-electric Height.

dependent variable:

* Reflection coefficient

Analysis done:

comparing reflection coefficient of circular patch with slot antenna and circular patch without slot at 2.46GHz frequency.

DESIGN AND ANALYSIS OF POLARIZATION RECONFIGURABLE ANTENNA REFLECTION COEFFICIENT AT 2.4 GHz and COMPARE WITH and WITHOUT SLOT

Data Collection: with and without slot

S.NO	GROUP1	FREQUENCY	REFLECTION-COEFFICINT	GROUP2	FREQUENCY	REFLECTION-COEFFICINT
1	1	2.25	-.8423	2	2.25	-.6139
2	1	2.30	-1.5602	2	2.30	-1.0333
3	1	2.35	-3.6561	2	2.35	-2.0939
4	1	2.40	-8.4376	2	2.40	-5.3322
5	1	2.45	-10.4445	2	2.45	-11.5181
6	1	2.50	-4.2479	2	2.50	-4.6105
7	1	2.55	-2.0437	2	2.55	-2.0854
8	1	2.60	-1.2294	2	2.60	-1.2073
9	1	2.65	-.8586	2	2.65	-.8240
10	1	2.70	-.6634	2	2.70	-.6282
11	1	2.75	-.5507	2	2.75	-.5176
12	1	2.80	-.4819	2	2.80	-.4513
13	1	2.85	-.4388	2	2.85	-.4105
14	1	2.90	-.4120	2	2.90	-.3856
15	1	2.95	-.3963	2	2.95	-.3713
16	1	3.00	-.3887	2	3.00	-.3646

TABLE AND GRAPH(SPSS):

Group Statistics:

	group	N	Mean	Std. Deviation	Std. Error Mean
frequency	With slot	16	2.6250	.23805	.05951
	withoutslot	16	2.6250	.23805	.05951
Reflection	withslot	16	-2.290757	3.0435335	.7608834

coefficient	withoutslot	16	-2.027977	2.9475509	.7368877

Independent Samples Test:

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
frequency	Equal variances assumed	.000	1.000	.000	30
	Equal variances not assumed			.000	30.000
Reflection coefficient	Equal variances assumed	.128	.723	-.248	30
	Equal variances not assumed			-.248	29.969

Comparison of reflection coefficient of with and without slot by varying the frequency ranging from 1GHz to 3GHz.there is statistically significant difference in reflection coefficient of with and without slot. The reflection coefficient of without slot is higher when compare to with slot.

BAR CHART COMPARITIVE MEANS:

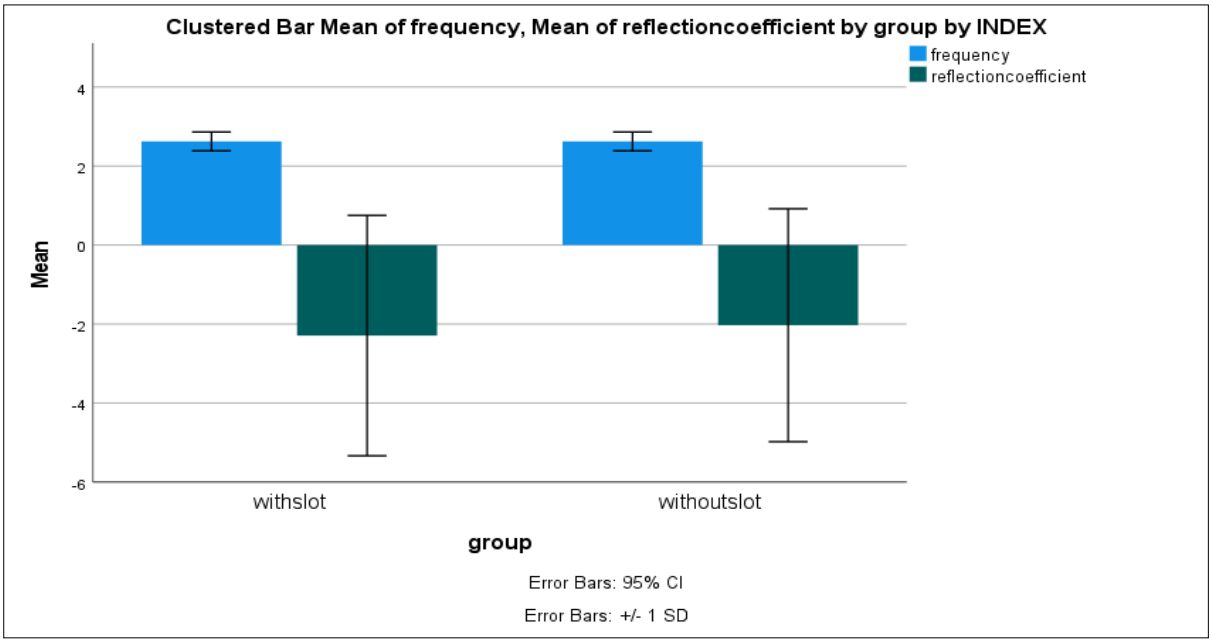
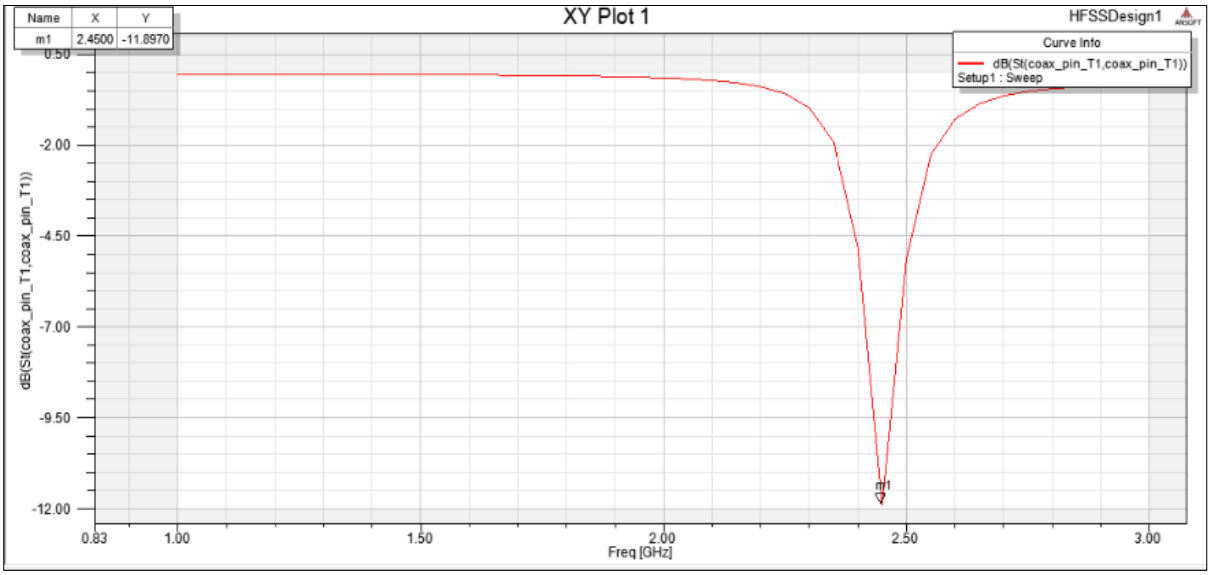


Fig. Bar chart comparing the mean reflection coefficient of with and without slot by varying the frequency. There is no significance difference between the two groups p>1.00(Independent sample t test).

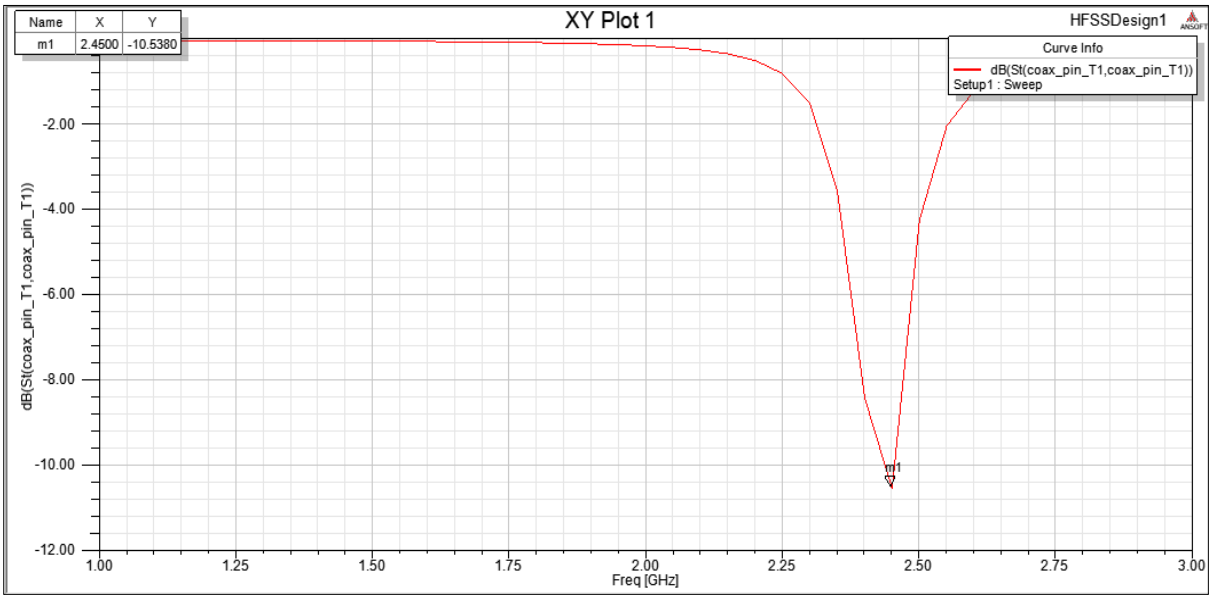
Results and Discussion:

WITHOUTSLOT REFLECTION COEFFICIENT:



Frequency at 2.45GHz and Reflection coefficient without slot = -11.8970dB

WITHSLOT REFLECTION COEFFICINT:



Frequency at 2.45GHz and Reflection coefficient with slot **= -10.5380dB**

DISCUSSION HINTS

(SSE|21|12)256-1) Hints

A. praveen
191712256

Project1:

Design and analysis of polarization Reconfigurable antenna reflection coefficient at 2.4GHz and compare with and without slot.

para-1

circular patch antenna reflection coefficient is higher in without slot compare to withslot.

para-2

* slot creation affects the reconfigurable antenna reflection coefficient.
* As increases the slot creation, reflection coefficient decreases.

para-3 IEEE Explore citation=47, Google scholar citation=44
Author: Ka ming mak, Hau wah lai, march 2017.
performed a polarization reconfigurable circular patch antenna with a c-shaped.
Author: y. p. selvam, August 2018.
Investigation the patch-slot antenna array with compound reconfiguration.

Modification:

slot created with length = 5 mm
and width = 5 mm

future scope:

Increase reflection coefficient and fabricated in future.

Limitations:

Reflection coefficient not exceed below -10dB while creating slot in with and withslots

conclusion:

within the limits of this study, reflection coefficient in without slot is higher compared to with slot.

Approved,

(Guide).