**DESIGN AND ANALYSIS OF CIRCULAR PATCH ANTENNA GAIN PATTERNAT 2.4 GHz and COMPARE WITH and WITHOUT SLOT**

Materials and methods

Para 1

- [ ] Study setting –(SSE/21/12/256-3)

- [ ] Ethical approval: Nil

- [ ] No: of groups: 2

- [ ] Sample size:16

-[ ] Total sample size:32

- [ ] Pre-test Power (use g power): 0.80

Para 2

[ ] Sample preparation group 1- Frequency Setting and analyze

* Micro-strip Patch Antenna:
  + Lg = 10 cm ,Wg = 9 cm , RP = 9.22 mm,
  + Substrate: L = 10 cm, W = 9 cm , t = 0.32 cm.
* Feed Position: coaxial probe
  + Radius = 20.95 mm
  + Height = -0.5 cm.
* Antenna is designed using XYZ coordinates
* Frequency is implemented and analyzed under varying Analysis set up.

Para 3

- [ ] Sample preparation group 2 – Gain in With slot and Without Slot

Lg = 10 cm, Wg = 9 cm , Rp = 9.22 mm,

Substrate : L = 10 cm, W = 9 cm , t = 0.32 cm.

* + Slot Dimensions

Length = 0.15 cm

Width = 0.2 cm

Para 4

- [ ] Testing set up

(Mesh operation, Analysis setup, Radiation setup) in HFSS 14.0

- [ ] Testing procedure: Simulation

* Assign the dielectric material and frequency
* Calculating width and length of the patch using micro-strip line calculator
* Find feed point of the antenna
* Assigning Boundary
* Assigning excitation
* Analysis setup
* Validating the design
* Result Analysis

On varying the with slots and Without slot Frequency is analyzed and Gain is calculated.

- [ ] Data collection: .CSV file

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Frequency[GHz] | Without slot  Reflection coefficient[dB] | Without slot Gain | With slot  Reflection coefficient[dB] | With slot Gain |
| 2.45 | -10.8573 | 7.2119 | -11.9847 | 7.1977 |

Para 6

- [ ] Statistical software used: ORIGIN,SPSS

- [ ] Independent variables: Frequency, Relative Permittivity

- [ ] Dependant variables: Gain in with slot and without slot

- [ ] Analysis done: Resonant Frequency at 2.4 GHz