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DESIGN AND IMPLEMENTATION OF PATCH ANTENNA

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ABSTRACT
The demand for broadband applications has grown in today's modern era. A lot of work was done by designing antenna systems last year. The radiation pattern for Tshape antenna is almost Omni directional for the operational bands, the gain variation in each band over the range must be less than 3 dBi. Proposed antenna's size is decreased by 26.5 percent while achieving a maximum impedance bandwidth of around 121 percent. In this study, we compare the wideband slot antenna properties of Tshape Antenna, Horn Antenna, Microstrip Patch Antenna, and slotted antenna.

Keywords: Impedance; Radiation pattern; communication system; Omni directional; patch antenna;

1. INTRODUCTION
Primary components of communication system are Antennas. All types of Antenna are, including slotted antennas in the T-shape, micro strip patch, and folded configurations, are passive devices. Radiated power in those antennas cannot be more than transmission power. [1]

2. T-SHAPE SLOT ANTENNA
Coplanar printed slotted Antenna is the most basic configuration of any type of planar antenna, consisting of just one metallic layer. The design of the Tsheped Antennas has freshly drawn a lot of interest since slotted Antenna has the benefits of wider band width and simple combination with MMICs [1,3]

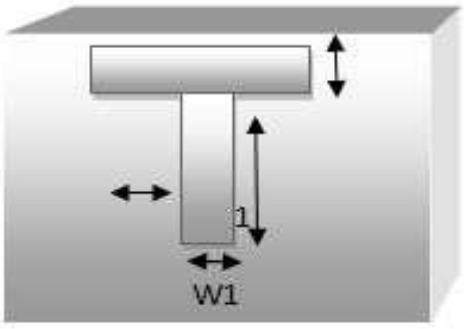

Figure (1) T-shape slot antenna

Using HFSS, the antenna shape and size were first searched, and the dimensions were established through experimental adjustment. [3]

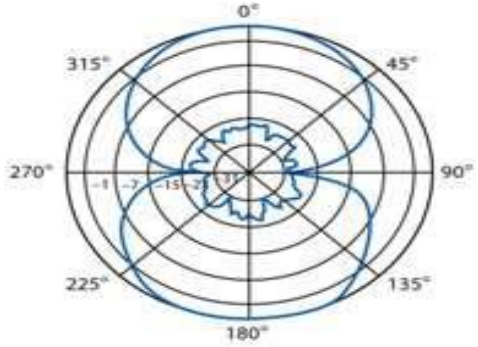

Figure (2) Radiation pattern

3. MICRO STRIP PATCH ANTENNA

A patch that is ½ a wavelength lengthy and set precisely above a bigger ground plane, often with a dielectric spacer in between, make up the simplest patch antenna. While increasing the antenna's size, larger ground-planes generate stable Pattern and reduce ecological sensitivity. The ground plane frequently has a modestly smaller area than the active patch.[1,2]

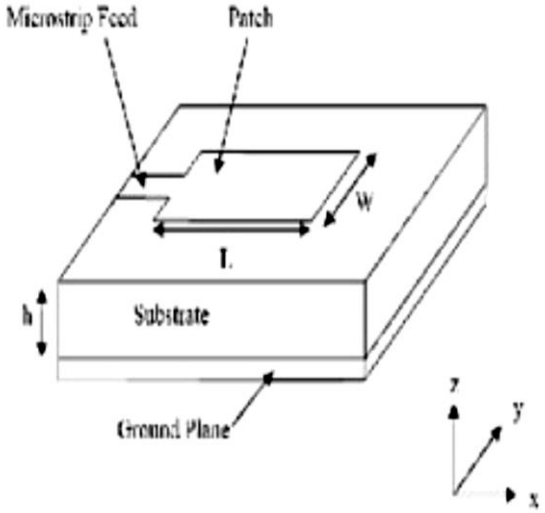

Figure (3) Structure of Microstrip Patch Antenna

Ground planes can couple and produce currents along its edges that also radiate when it is almost the same size as the radiator. The result of combining the two sets of radiators is the antenna pattern. [3]
Figure (4) below shows radiation pattern of Microstrip Antenna (Patch) which is Omnidirection.

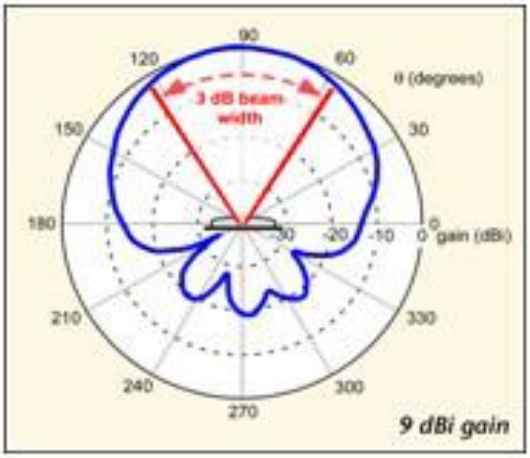

Figure (4) Antenna Radiation Pattern

4. HORN ANTENNA

The well-known desirable qualities of the pyramidal horns, such as their weight, lowest VSWR, lower profile, and compatibility, have made them quite popular. The radiation properties of the object as it flares in both directions primarily combine the geometry and the E and H-planes sect-oral Horn. Figure 5 depicts the coordinate system. You can think of the horn as an aperture antenna. Techniques based on the equivalent principle can be used to determine its radiation properties.[3]

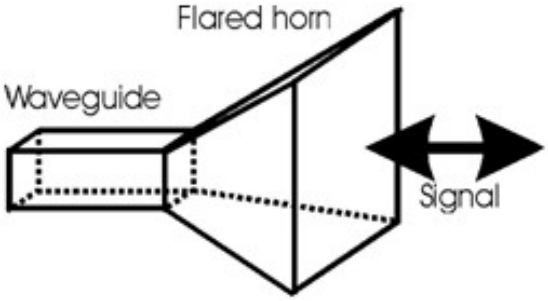

Figure (5) Horn antenna

It is important to have knowledge of the lateral Electric as well as Magnetic fields over the closed surface in order to create an exact equivalent of it. Closed surface, which is typically chosen, is the endless plane that matches the horn's Aperture.

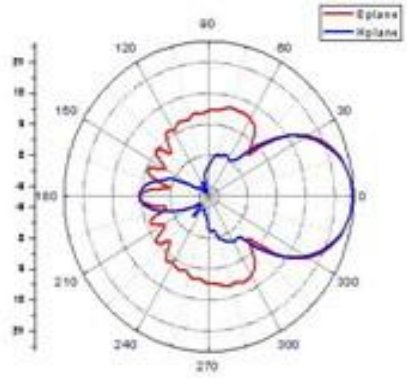

Figure. (6) Antenna Radiation pattern

5. RESULTS AND DISCUSSIONS-

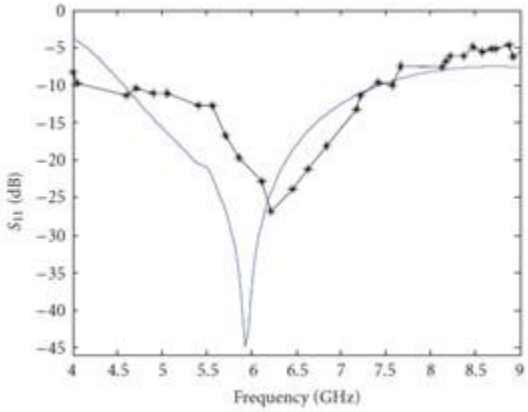

Figure. (7) -Return Loss Vs Frequency plot

The prototype antenna's calculated I/P Impedance BW is 03.310 GHz (04.270-07.580 GHz), whereas the simulated BW is 02.850 GHz (04.730-07.580 GHz) (return loss 10 dB). Even though there is significant agreement between the results from simulation and measurement, manufacturing precision might be improved.

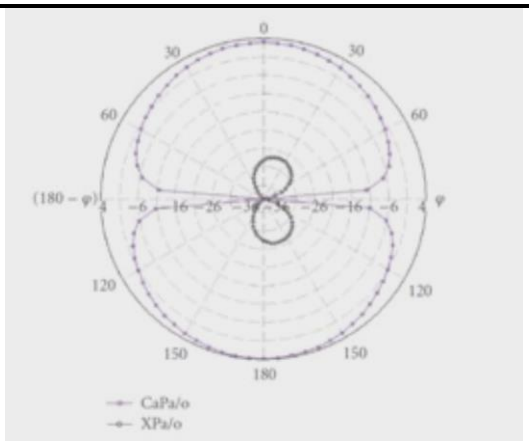

Figure 8(a) E-plane pattern (dBi)

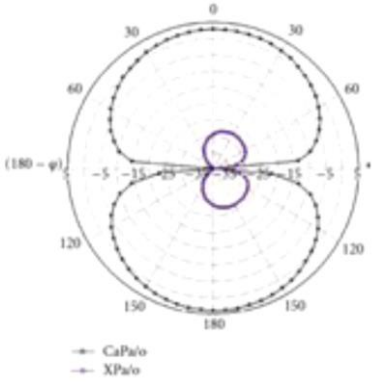

Figure 8. (b) H-plane pattern (dBi).

Only simulated radiation patterns are shown because testing facilities are scarce. Figures 8(a) and 8(b), respectively, depict the E and H planes radiation pattern simulated at 06.060 GHz. In both E & H planes, the Radiation Pattern are bidirectional. We noted that cross-polarisation level in the E & H-plane is tightly controlled. The antenna is furthermore linearly polarised.

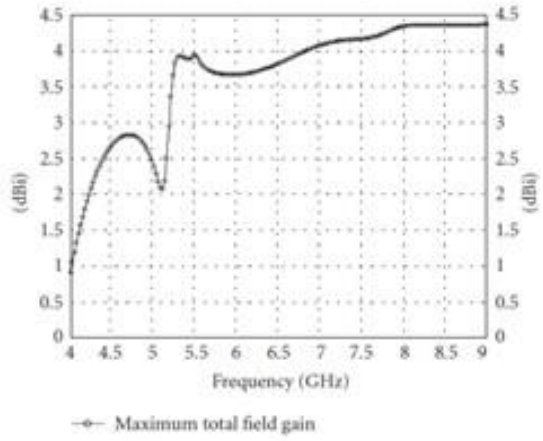

Figure (9) Gain Vs frequency.

The Gain Vs Frequency Plot is shown in Figure 9. The Simulated Peak of antenna gain is 04.390 dBi at 08.10 GHz.

6. CONCLUSION

Broad band TShape slotted Antenna offers a 10-dB lower return loss than all other antennas, giving it an edge over the competition. The T-shape slot antenna's symmetrical construction results in an omnidirectional radiation pattern. Its peak antenna gain is roughly 4.8 dBi, and gain changes between 1.8 GHz and 6 GHz are less than 3 dBi. The Tshape slot antenna provides almost Omni-Directional Pattern for all bands, including 3G, Bluetoth, PCS, and WANL and Gain variation in each of the bands is less than 03.0 dBi. This is in additional to benefits of inexpensive costs, simple in structure, and wider operating frequency band.

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