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DESIGN AND ANALYSIS OF 2.4 GHZ MICROSTRIP PATCH ANTENNA FOR USING WLAN HFSS

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ABSTRACT

The simple antenna of the microstrip patch contains a metal ring and the ground between which is a dielectric medium called a substrate. Microstrip patch antennas are used for communication purposes especially in military and civilian systems. In this paper a simple microstrip patch antenna was built into ANSYS HFSS at a frequency of 2.4 GHz.

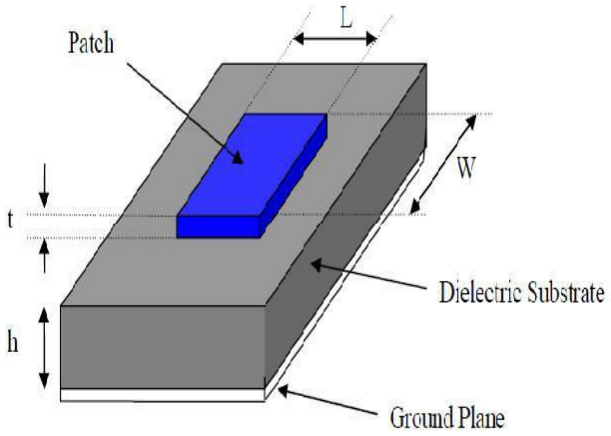
The designed antenna can be used for ISM (industrial, scientific and medical) band and WLAN applications. The designed antenna has a low profile, low cost, easy design and good separation. The antenna is built using Ansoft HFSSV13 software and the designed antenna provides minimal loss back -10dB. The parameters such as return loss, voltage standing wave ratio (VSWR), coupling, gain, radiation pattern were generated and analyzed.

INTRODUCTION

The Micro strip antenna was first introduced in the 1950s. However, the technology of the Print Circuit Circuit Board (PCB) was introduced in the 1970s. At that time, since then the MSA was a very common plague with many applications due to its weight gain, low profile, low cost, planetary suspension and much more. MSAs are widely used in Radio-Frequency Idicationication (RFID), radio broadcasting, mobile phones, Global Positioning System (GPS), satellite communications, television programs, dual-input (MIMO) systems, auto collision avoidance system, system test, launch guidance, radar systems, remote sensing, machine guidance, and more.

Due to the small number of unique and attractive strip patch antennas, there seems little doubt that they will continue to receive more applications in the future. Its properties include, light weight, low profile, lightweight design, compact and compact layout.In this design, we focused on a patterular antenna for a microstrip patch with a square wavelength [L1] and a width [W2]. The proposed antenna operates on a 2.4GHz wireless 24GHz (2400-2484MHz) wireless network based on IEEE 802.11b WLAN applications.

MICROSTRIP PATCH ANTENNA DESIGN



APPLICATIONS

After a good and bad analysis of microstrip antennas, it can be noted that its advantages outweigh its disadvantages. Because most current systems require small, lightweight, low-cost and low-power antennae, the employment of micostrip technology is rising significantly over the years. Although standard ants have much higher performance than microstrip ants, they are still clearly disturbed by other structures of microstrip antennas. Listed below are some common software applications that employ microstrip technology:

1. Telephone and telecommunications equipment.

2. Radar altimeters using a small array of radiostrip radiators.

3. Flight-related applications include telephone and satellite communications.

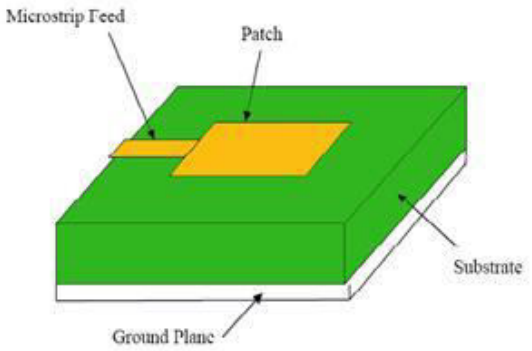
4. Satellite imaging systems.

5. Satellite communication

6. WLAN and WIMAX.

7. High speed GPS.

First, the magnitude of the rectangular positioning was calculated using the formulas as shown below. The width of the bottom and bottom plane is required to calculate the power consumption & bandwidth which depends on the operating frequency and the infinite dielectric substrate.

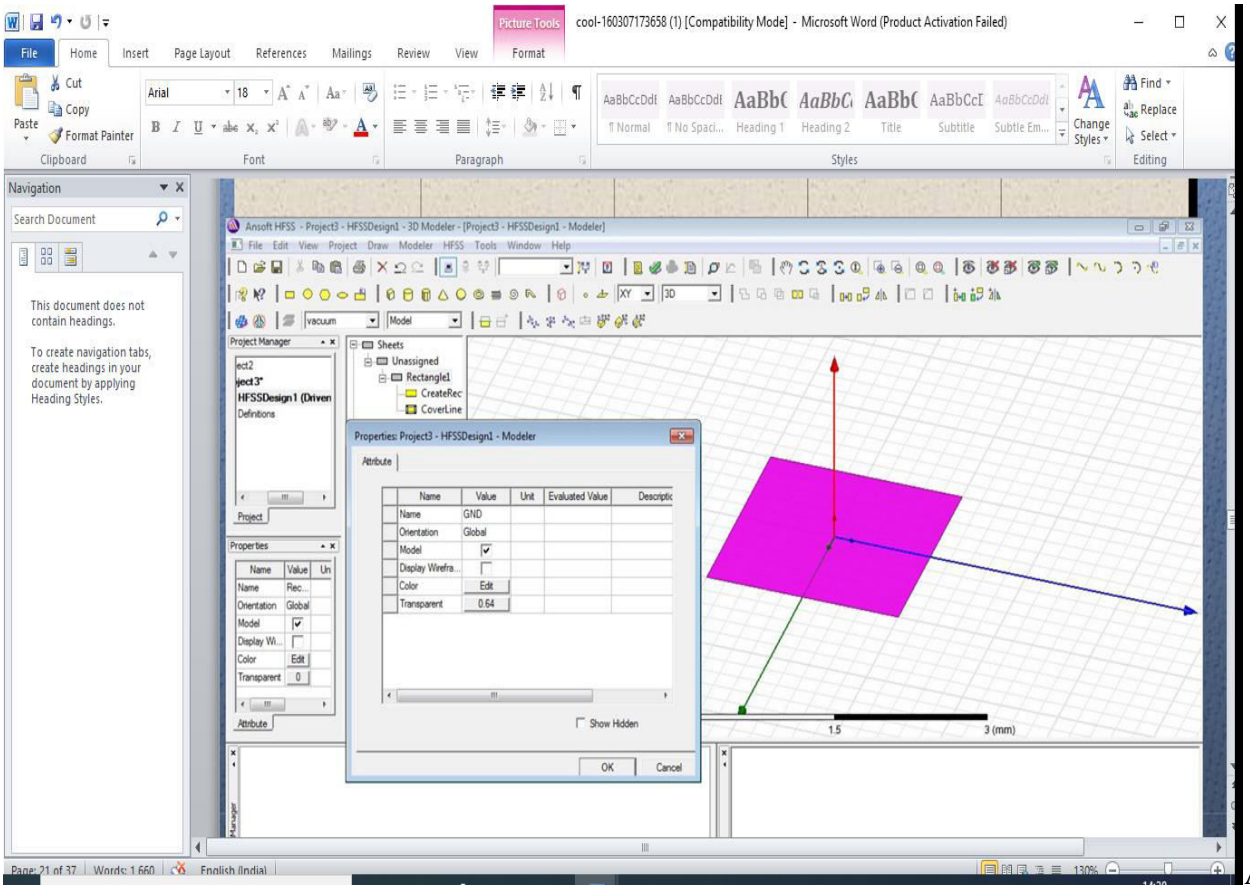


HFSS

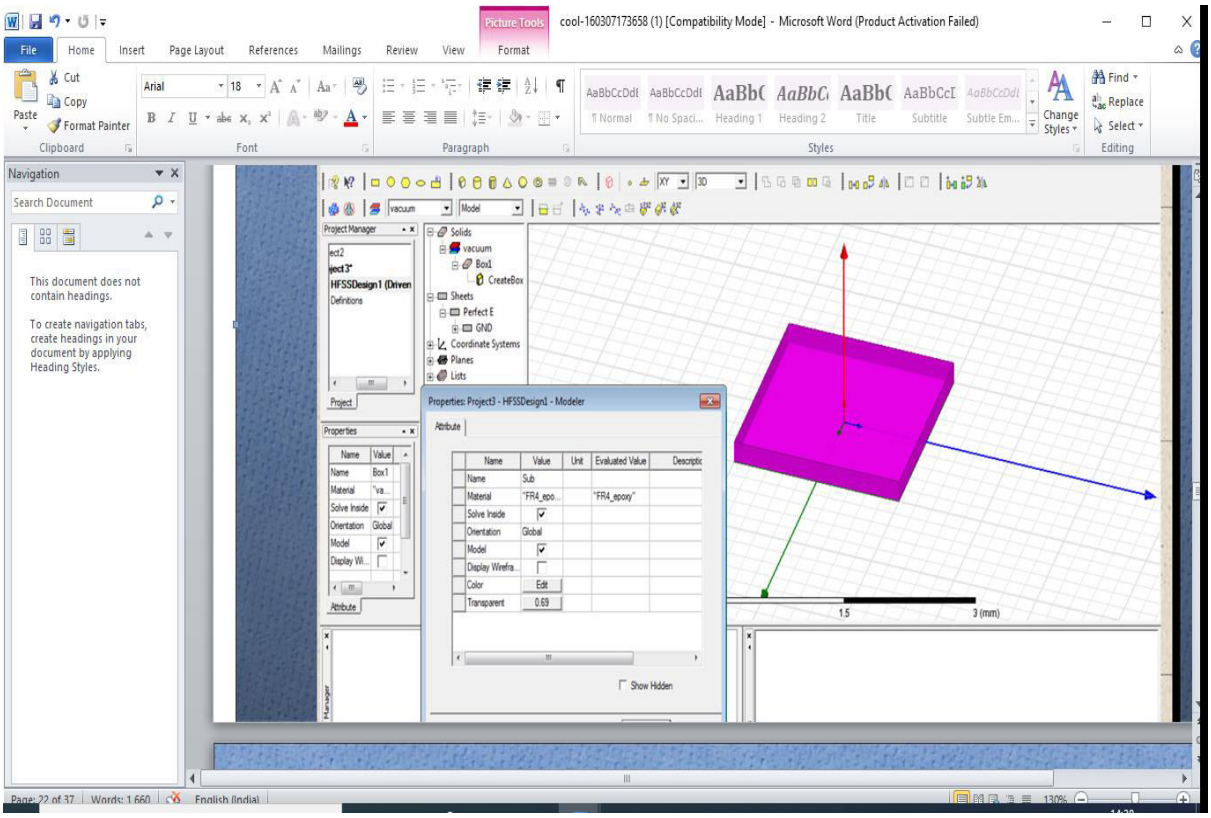
(HIGH FREQUENCY STRUCTURE SIMULATOR)

Ansys HFSS is an electronic 3D modeling (EM) software for designing and measuring high quality electronic antennas, antenna arrays, RF or microwave materials, high-speed communications, filters, connectors, packages for -IC and printed circuit boards. Developers around the world are using Ansys HFSS to design high-speed, high-speed electronics available in communications systems, radar systems, advanced driver assistance systems (ADAS), satellites, Internet-of-the-art products (IoT) and other high speed RF and digital devices.

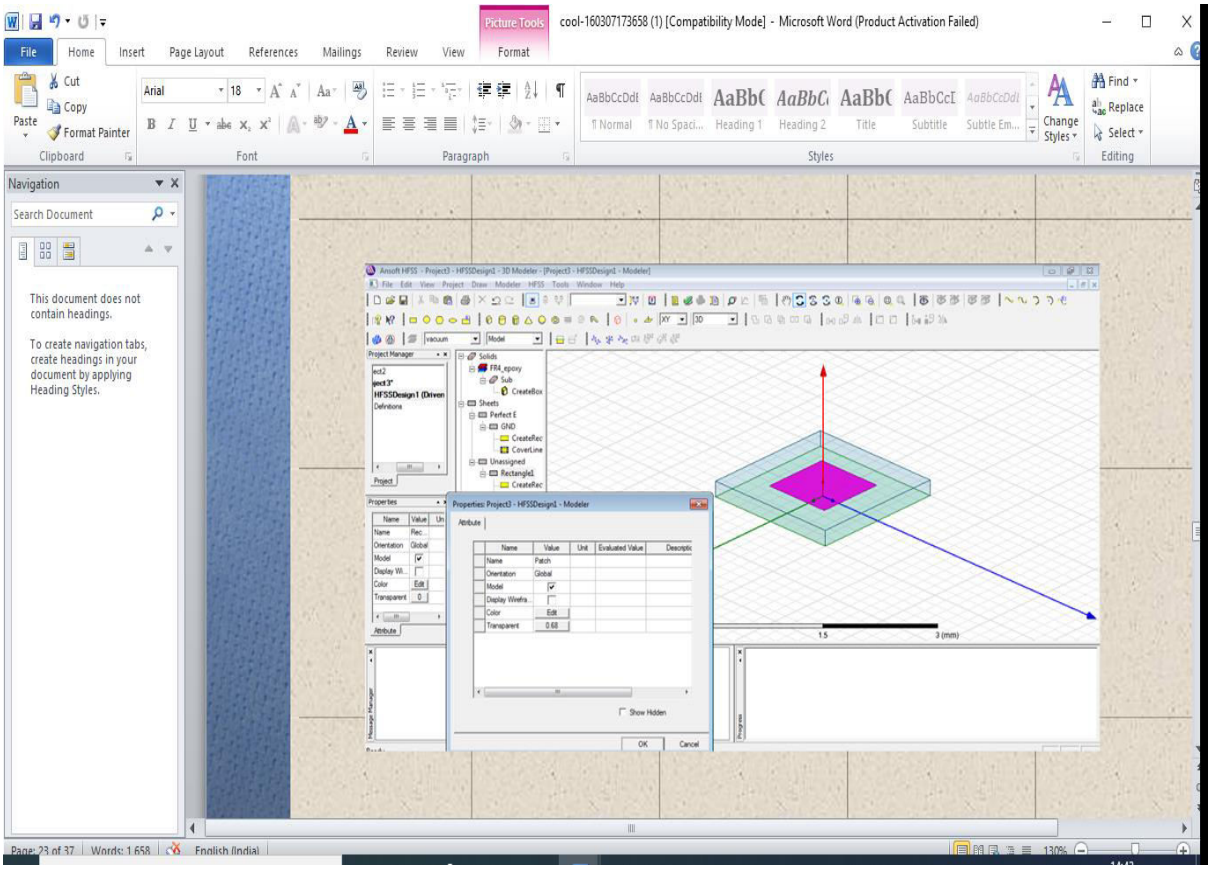
HFSS (High Frequency Structure Simulator) uses flexible solutions and intuitive GUI to give you exceptional performance and deep understanding of all your 3D EM problems. In combination with Ansys's functional, structural and water-based tools, HFSS provides a comprehensive and comprehensive analysis of electronic products, ensuring its thermal and structural integrity. The HFSS is comparable to the overall gold precision and reliability of dealing with 3D EM challenges due to its efficient meshing system and sophisticated solutions, which can be accelerated with advanced computational technology (HPC).



ADDING GROUND

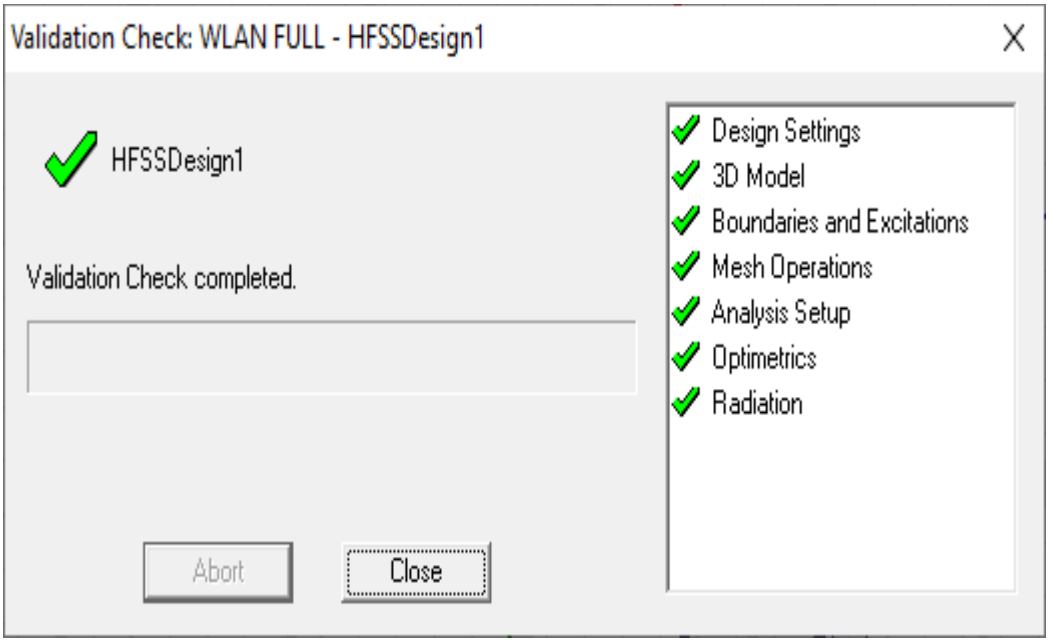


ADDING SUBSTRATE

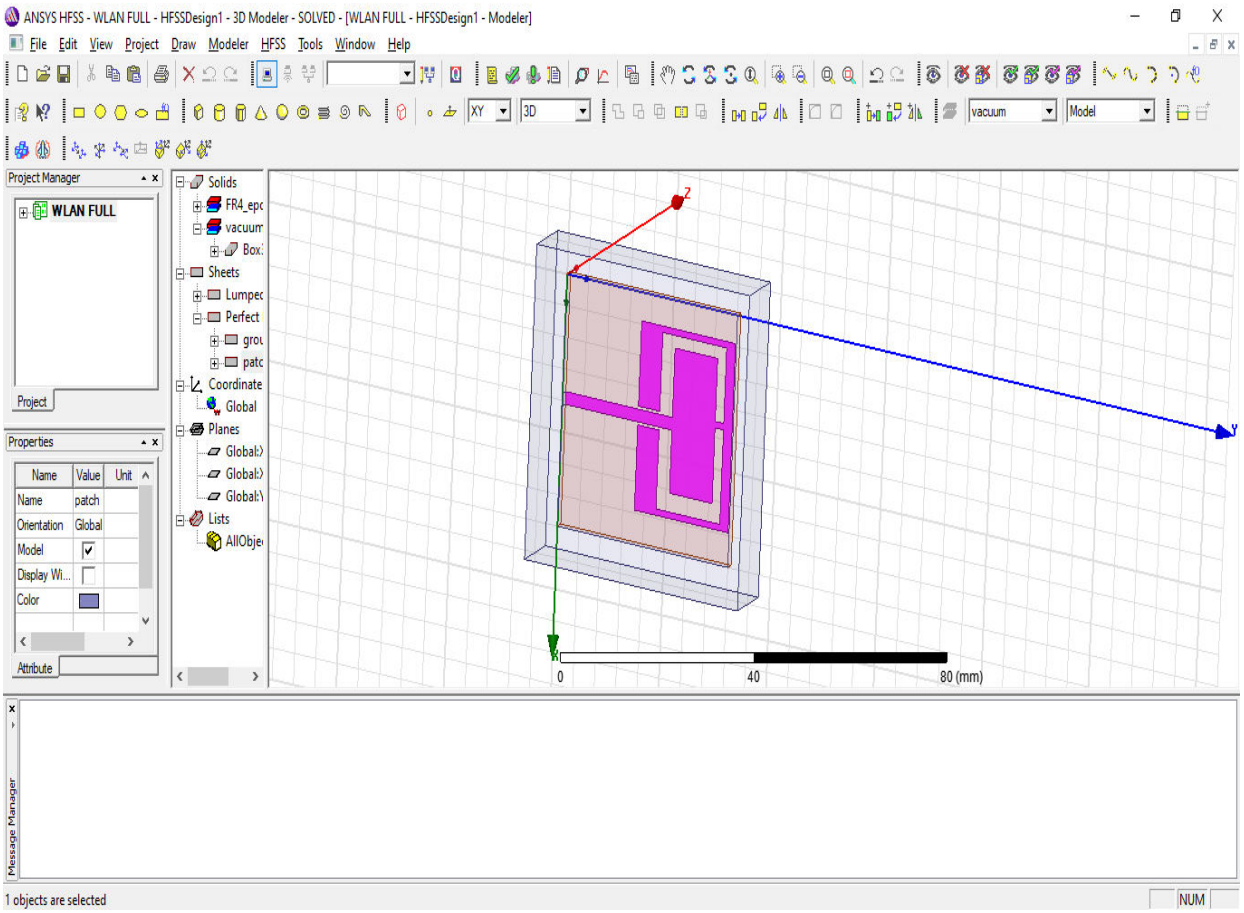


ADDING PATCH

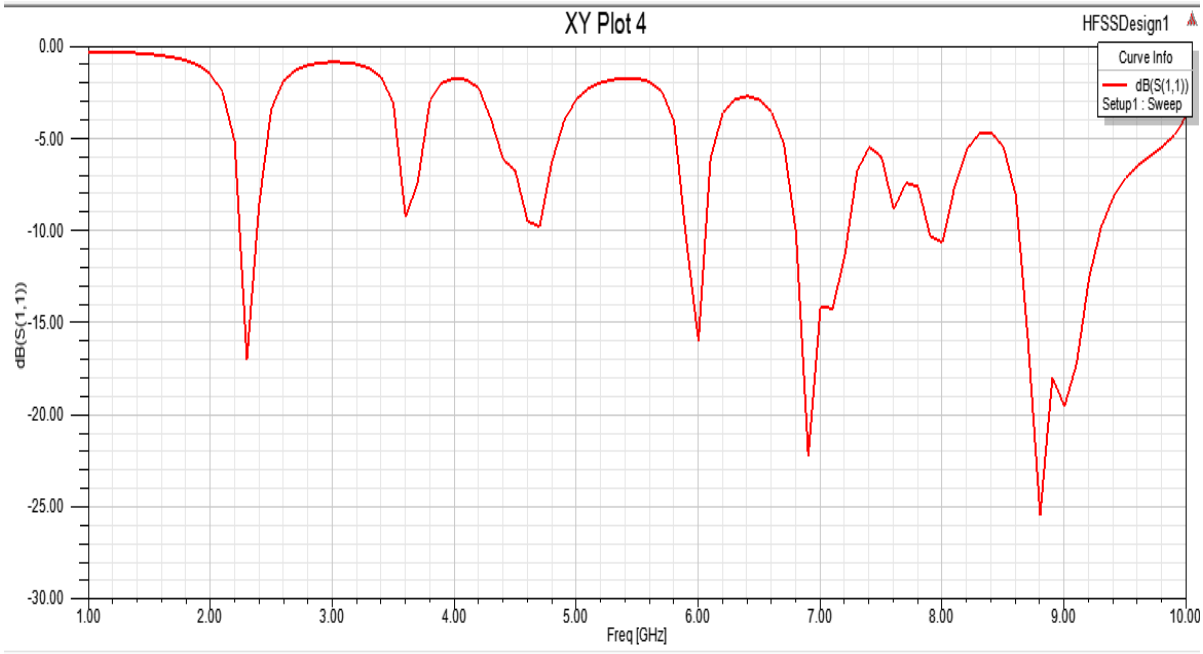
SIMULATION CHECK



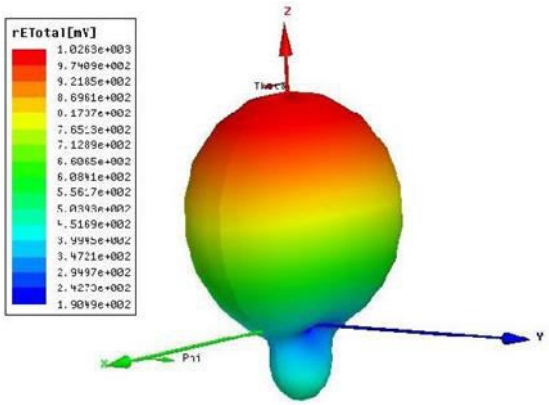
RESULT (ANTENNA DESIGN)



GRAPHS 1.1 XY PLOT



RADIATION PATTERN



CONCLUSION

The proposed design achieves an evolution from simple Rectangular Microstrip Patch antenna towards a flexible Microstrip patch antenna. The proposed designs includes the study of Microstrip patch antenna with substantially negligible thickness, on a KaptonPolymide substrate with the conductive ground plane as well as the patch made of Copper.

Thus, the proposed antennas designs represent a Flexible Patch antenna which is operable at robust, thin and has a low profile. These properties make it very useful in applications where space available is less and also where efficiency cannot be compromised.

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