# Antena design

Design

Parameters of the proposed antenna w Lag Values 20 12 5 parameters 3 4 10 Wag 16 We printed the radiator patch and the ground plane on the opposite sides of the substrate layer of epoxy type FRR-4 with dielectric constant of Ere = 4. 3 and height h = 1. Mm. Fig. 1. Shows the overall dimensions of the designed antenna are LAX. Fig. I-a shows the radiator of the proposed antenna represented in rectangular shape of dimensions Al emanates from him two lines each line has width WWW with two flexing per each line. The two lines connected together by a short line of dimensions Wax to give U-shape.

Addition we enhanced the radiator by a two square shapes of dimensions Laxly at the upper side of each line, which they give good response at the lower resonant frequency 2. 4 GHz. The radiator excited by 50 microspore feed line of dimensions Leaf. Real = 45. 4 Image = 7. 5 Real = 43 Image = -4. 6 I/P Impedance Fig. 3. Shows the two parts of the impedance (real and imaginary) for the proposed antenna versus frequency, We can see clearly that the real part is approaching to 500 while the imaginary part is approaching to O for the two resonant give good match and more reliability.

Frequency/GHz Fig. 3. Impedance of the proposed antenna proposed antenna Fig. 4 shows the two radiation patterns E-plane at phi = 00 and H-plane at phi= 900 for the proposed antenna at the two resonant frequencies 2. 4 GHz and 3. 5 GHz. We can see from he curves that all radiation patterns have maximum value of radiation in the same direction. Fig. I-b shows the ground plane of the proposed antenna represented by rectangular shape of dimensions Lag. Addition we enhanced the ground plane with two parasitic elements printed on the substrate each parasitic has dimensions Laxly.

The simulation results of the designed antenna were displayed by using the software " CAST" computer simulation technology and discussed below. Fig. 2. Shows the simulation result for the return loss of the proposed antenna which as follow, -21. 71 db at the first sonant frequency 2. 4 GHz and -24. 24 db at the second resonant frequency 3. 5 GHz. We can see from the curve that the bandwidth at -10 db return loss is 237 Maze from 2. 276 GHz to 2. 513 GHz for the first band and 506 Maze from 3. 328 GHz to 3. 834 GHz for the second band. Rude Fig. 4. Radiation Patterns of the proposed antenna Fig. 2.

Return Loss of the proposed antenna Fig. 5. Shows gain of the proposed antenna versus frequency, the curve shows that the proposed antenna has gain of 1. 37 db and 1. 91 db for the two resonant frequencies 2. 4 GHz and 3. 5 GHz respectively. Gate/db (Comics-2013) LA= mm LA= mm LA= mm LA= mm Fig. 5. Gain versus frequency Fig. 8. Return Loss for different length of the parasitic Fig. 6. Shows the simulation result of VOWS (voltage standing wave ratio) for the proposed antenna, from the curve we can see that the " VOWS" lies in the range 1-2 that mean most power delivered from the feed line to the antenna radiated [1].

Fig. 7. And Fig. 8. Are showing a good and simple methods for adjust the two resonant frequencies of the proposed antenna within acceptable range. . Γ? WAR Fig. 6. VOWS of the proposed antenna Fig. 7. Shows the effects of width change for the two arctic elements WWW= (2 mm, 6 mm and 10 mm) on the resonant frequencies whereas keeping the length of the parasitic constant at 18 mm, increasing parasitic width WWW lead to decrease in the resonant frequencies for the proposed antenna.

The proposed antenna has a simple design and fabrication. The simulation results show a good return loss, bandwidth, gain, impedance, radiation patterns, and VOWS at each one of the two resonant frequencies 2. 4 GHz and 3. 5 GHz. The parasitic elements on the ground plane provide more flexibility to adjust he two resonant frequencies while remain all other dimensions constant.