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Circular Slot Antenna with Coaxial Feed for LTE Application

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ABSTRACT:

In the most recent days slot antennas are mostly used in the wireless communication due to the salient features like low cost, less weight, small size. In this project, We have reported that on the insertion of a circular slot on the antenna resonates at two different frequencies and also presents marked improvement in the bandwidth and ground plane antenna has been proposed. The radiation efficiency, return loss and directivity are measured for simple circular patch antenna and the modified antenna (antenna with circular slot). Bandwidth enhancement has been improved by suitably cutting slots into the rectangular patch and ground plane and also the Simulated radiation pattern of proposed antenna at various planes of E and H plan. Representation, measurement and calculation for this new antenna have been done with the help of the Computer Simulation Technology (CST) Microwave Studio Software.

Keywords: Circular slot, Coaxial feed, CST.

INTRODUCTION:

Opening reception apparatuses are generally utilized as a part of broadband correspondence frameworks because of their novel components, for example, wide recurrence transmission capacity, low profile, light weight, simple incorporation with solid microwave coordinated circuit, minimal effort, and straightforwardness of manufacture. The space radio wire composed utilizing CPW encourage system offers low scattering and low radiation spillage. At the point when the reception apparatus is bolstered by microstrip line, misalignment can come about in light of the fact that drawing is required on both sides of the dielectric substrate. While, when CPW bolster system is used to energize the space, drawing is uneven and thus arrangement blunder is wiped out. In CPW the conductor framed a focus strip isolated by a slender hole from two ground planes on either side.

The measurements of the middle strip, hole, thickness and the permittivity of the dielectric substrate decide the powerful dielectric steady and the trademark

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impedance of line. Likewise, conductor sponsored CPW is utilized as it gives extra ground plane at the base surface of the substrate which goes about as a mechanical support to the substrate and warmth sink for dynamic and detached circuit gadgets. The prevailing mode for the conductor upheld CPW is semi TEM mode with zero cut off recurrence. In this paper, CPW sustaining system utilizing capacitive coupling with limited ground plane is displayed.

The outlined CPW bolstered double band recieving wire produces two recurrence groups; viz 827MHz-833MHz and 895MHz-902MHz appropriate for GSM correspondence. Recreated results are analyzed by shifting the opening width from g=2 to g=4 all together to get the ideal impedance coordinating happening at 900 MHz recurrence. The measurements of the space are shifted to acquire the ideal estimation of the space so that the reception apparatus resounds at 900 MHz recurrence.

ANTENNA DESIGN:

The geometry of the proposed CPW bolstered capacitive coupled space radio wire with limited ground plane. The proposed recieving wire is shaped by scratching half wavelength opening g=2 found symmetrically regarding the focal point of the CPW bolstered line,

$$\lambda_g = \frac{c/f}{\sqrt{\varepsilon_{eff}}} \rightarrow 1$$

where "eff is the successful dielectric steady of CPW bolstered line and "f" is the thunderous recurrence 900MHz. In the CPW, the successful dielectric steady is autonomous of geometry what's more, is equivalent to the normal of dielectric constants of air and of the substrate.

$$\varepsilon_{eff} = \frac{\varepsilon_{air} + \varepsilon_r}{2} \rightarrow 2$$

CPW nourished capacitive coupled opening recieving wire is reenacted utilizing FR-4 misfortune free substrate with "r= 4.3, stature of the substrate h= 1.59 mm and misfortune digression 0.01 with limited ground plane of measure l w 280 mm 300 mm. Length of the opening is equivalent to half wavelength 102 mm utilizing condition (1) and the width of the opening is g=2. CPW sustaining strategy on thin substrate,

$$0.5 \leq \frac{w}{h} \leq 2.0 \rightarrow 3$$

$$\frac{s}{s+2w} \leq 0.4 \rightarrow 4$$

where 'S' is the strip width and 'w' is the gap width of a CPW fed line. Size of the strip width S and gap width 'w' is 4.5 mm and 0.5 mm. Analysis of the antenna design parameters, reflection coefficient, directivity, E-field pattern, H-field pattern are done by varying the width of the slot form _g=2 to_g=4. CPW is not very sensitive to substrate thickness and allows a wide range of impedance value from 20 to 250. The characteristic impedance of CPW fed line is nearly about 50. The design of wide slot antenna, width of _g=2 fed by CPW through capacitive coupling with finite ground plane on CST Software. Current density of the CPW fed capacitive coupled wide slot antenna with finite ground plane at 900 MHz.

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EXPERIMENTAL RESULT:

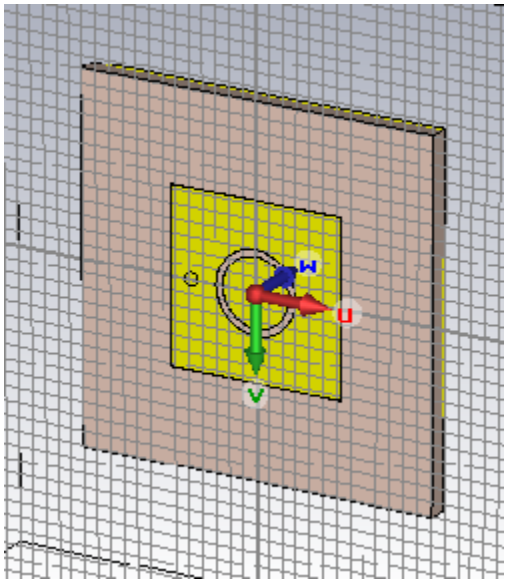
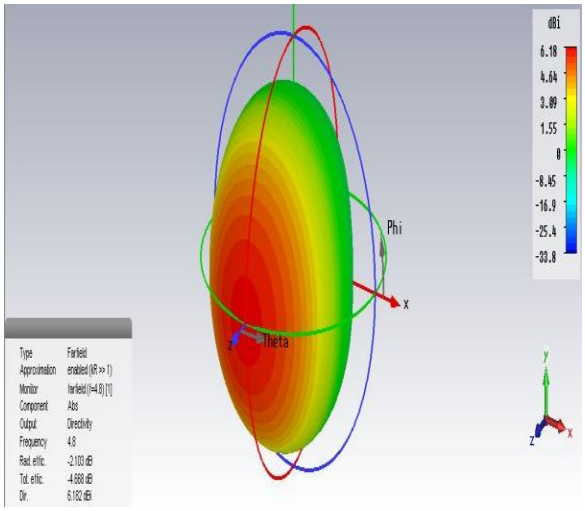
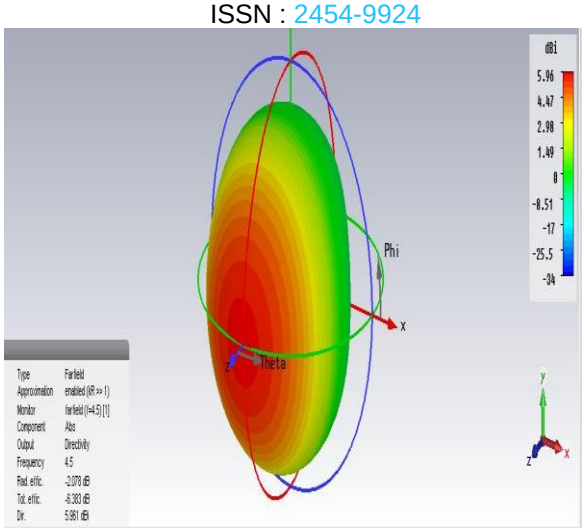


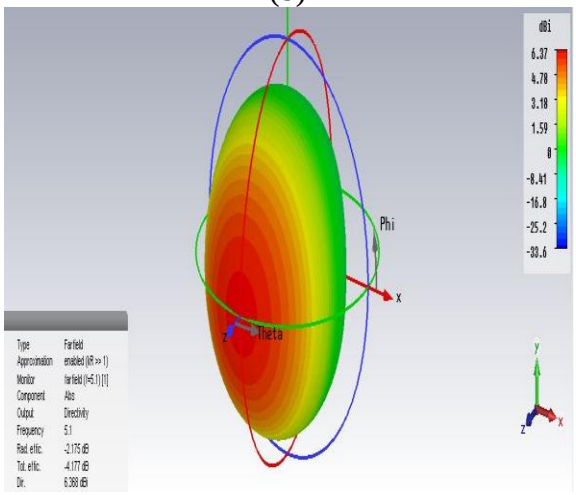
Fig 1. The diagrammatic representation of the Circular Slot Antenna.



(a)



(b)



(c)

Fig. 2. (a),(b),(c) Represent the functionality of the circular slot antenna

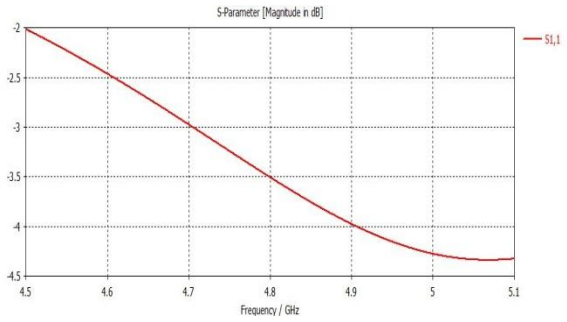


Fig. 3. Represent the simulated result of the circular slot antenna for S parameter.

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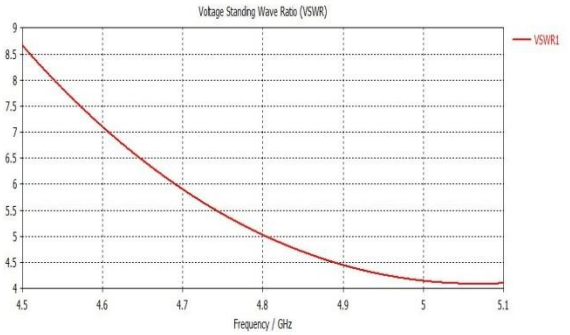

Fig. 4. Represent the simulated result of the circular slot antenna for VSWR parameter.

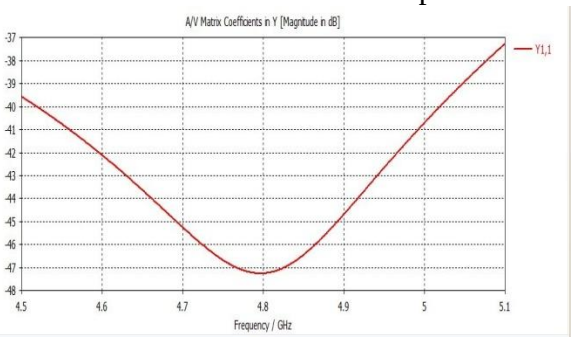

Fig. 5. Represent the simulated result of the circular slot antenna for Y parameter.

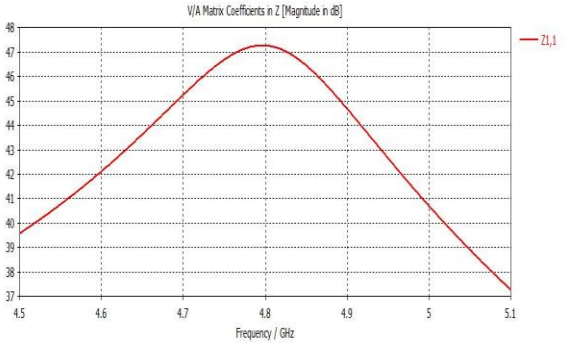

Fig. 6. Represent the simulated result of the circular slot antenna for Z parameter.

CONCLUSION:

This paper has displayed a Circular slot antenna encouraged capacitive coupled opening reception apparatus with limited ground plane. It offers great impedance coordinating at 900 MHz recurrence with double band qualities. The composed recieving wire shows low scattering by utilizing Circular slot antenna nourish component and finishes unidirectional radiation design with low cross polarization. Reenacted comes about delineate that the radio wire has 47 dB return misfortune at the thunderous recurrence of 900 MHz having wide space with measurement g=2. The radio wire reverberates at 900 MHz because of the opening while at 830 MHz it reverberates because of ring structure. The ground plane at the posterior of a substrate which goes about as a reflectors centers the most extreme power exchanged to a craved heading. The greatest power is extricated from electromagnetic waves taken after by coordinating system and rectifier. Likewise, the acquired DC Energy can be put away in battery as a move down.

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