A Novel Dual Band Circular Microstrip Patch Antenna for Wireless Applications

Ansuman Patnaik
Department of Electronics and Communication
V.S.S.U.T, Burla, India

Diptimayee Konhar
Department of Electronics and Communication
V.S.S.U.T, Burla, India

ABSTRACT
A novel simple circular microstrip antenna of radius=16.625mm, a substrate of relative permittivity Єr=4.2 and thickness h=1.6mm is proposed to operate for multiband applications. The measured frequencies are found to be 2.2875GHz and 2.475GHz.The simulation of the proposed antenna is done on IE3D software.

Keywords
Circular microstrip antenna; Radiation pattern;T-slots,Wireless Communication.

1. INTRODUCTION
Microstrip antenna are used in communication systems owing to their advantages such as low profile, conformability, low manufacturing cost and easy association with other circuit components[1].Among the conventional microstrip antenna geometries, circular microstrip antenna is most widely analysed antenna perhaps due to easy mathematical modelling and applicable boundary conditions[2].A cross-slot dual frequency patch antenna was studied in[6].Dual frequency bands of operation have also been reported in[5].The proposed circular microstrip antenna has a T-shaped slot as shown in figure1.By using T-shaped slot in the circular patch multiple frequencies are obtained at 2.2875Ghz and 2.475Ghz.

2. ANTENNA DESIGN
In order to design a circular microstrip antenna for multiband applications suitable dielectric substrate of relative permittivity Єr=4.2 and thickness h=1.6mm is chosen. The circular microstrip antenna has radius=16.625mm.T-shaped slot with appropriate dimension is provided on the circular patch to get dual band frequencies. The proposed antenna is probe fed at (x=0, y=4.7mm) from the patch centre and antenna parameters like Reflection co-efficient, VSWR and Radiation pattern at corresponding resonance frequencies are simulated.

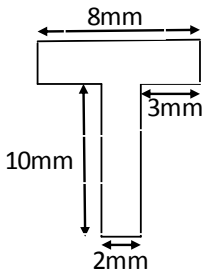

Figure.1: Display of dimensions of applied 'T' slot.

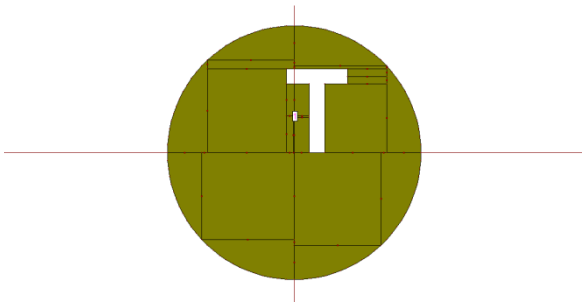

Figure 2: IE3D Simulated View

3. ANALYSIS AND RESULT
The simulation of the proposed antenna is done on IE3D software .Simulation gives dual frequencies at 2.2875GHz and 2.475GHz.Variation of simulated reflection coefficient with frequency, simulated VSWR with frequency, input impedance variation of antenna as a function of frequency and Radiation patterns are shown in figure3,figure4,figure5,figure6 and figure7 respectively.

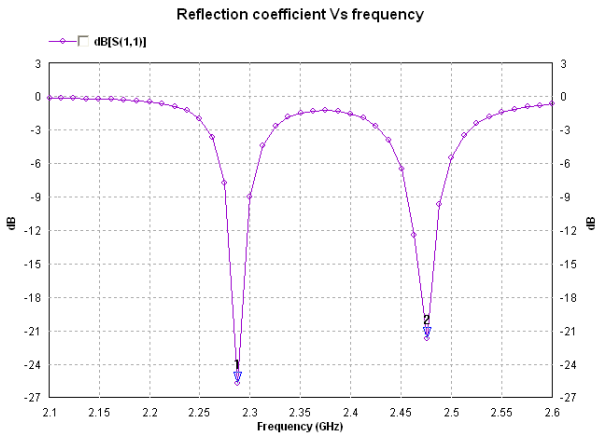

Figure3: Variation of simulated reflection coefficient (S11) with frequency for a circular patch antenna with 'T'slot

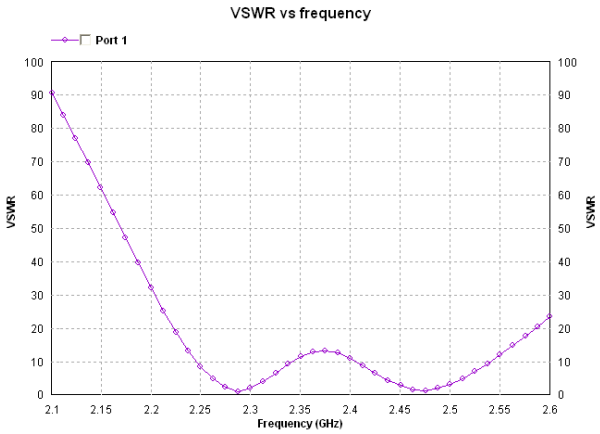

Figure4: Variation of VSWR with frequency for circular patch antenna with 'T'slot

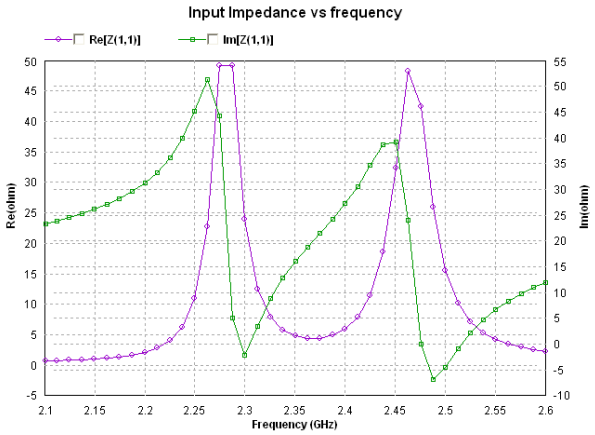

Figure5: Variation of input impedance with frequency for circular patch antenna with 'T'slot

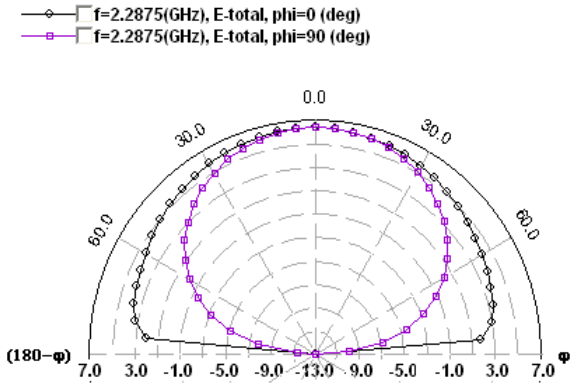

Figure6: Simulated radiation pattern at f=2.2875GHz

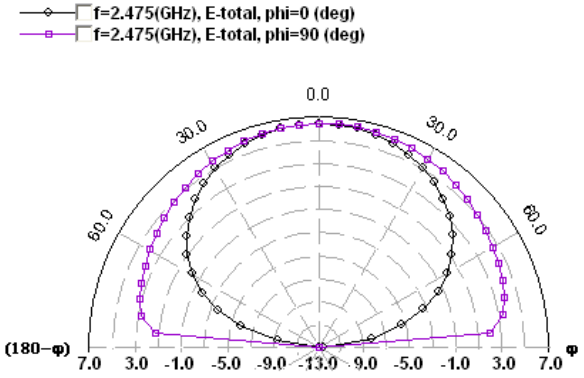

Figure7: Simulated radiation pattern at f=2.475GHZ

Table: The different results are given below

Band	fr (GHz)	RL (dB)	VSWR	Zin (re)	Zin (img)	Directivity (dBi)
1	2.2875	-25.68	1.11	49.14	5.08	6.33
2	2.475	-21.71	1.18	42.41	-0.01	6.43

4. CONCLUSION

A probe fed circular microstrip antenna with T-shaped slot for multiband applications is presented.The proposed antenna shows good radiation characteristics at resonance frequencies. The proposed patch antenna is a rugged, low cost antenna solution for wireless applications.

5. REFERENCES

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