Research article Available online www.ijsrr.org ISSN: 2279–0543

International Journal of Scientific Research and Reviews

# Design of a Monopole Antenna at 433 MHz and 868 MHz Frequencies

**Prathibha T P[1*], Jayanth C[2] and Sandeep Vedagarbham[3]**

[1]*M.Tech Student, Dept. of TCE, Dayananda Sagar College of Engineering, Bengaluru-560078, Karnataka, India*
[2]*Assistant Professor, Dept. of TCE, Dayananda Sagar College of Engineering, Bengaluru-560078, Karnataka, India*
[3]*Chief Technical Officer, Lambdoid Wireless Communications, Bengaluru-560041, Karnataka, India*

## ABSTRACT

We present a monopole antenna that operates between 428MHz-438MHz and 863-876MHz frequency bands. The proposed single antenna operates for dual frequencies for LoRa applications. LoRa is an emerging technology in the field of digital wireless communication systems focused for M2M and IoT. A printed monopole antenna is designed using the CST (Computer Simulation Software) studio suite which is three-dimensional electromagnetic simulation software. It provides computational solutions for electromagnetic design and analysis.

**KEYWORDS:** LoRa, M2M, IoT, CST, monopole

***Corresponding author**

**Ms. Prathibha T P**

M.Tech student

Department of Telecommunications,

Dayananda Sagar College of Engineering,

Bengaluru-560078, Karnataka, India

Email: prathiprakash1995@gmail.com

## INTRODUCTION

The internet of things corporations are delivery several technologies and solutions to the market with little chip producing industries investment more cash within the market so it's growing drastically. It isn't anyway while not its difficulties. One in every of the key difficulties in understanding the IoT is guaranteeing that those "things" or finish hubs are really able to speak with the net. The sheer variety of current internet gadgets is big and is needed to succeed in thirty billion by 2020. LoRa alliance enables the deployment of LPWAN IoT in large scales. LoRa uses a spread spectrum technique which is derived from chirp spread spectrum. It has wide variety of applications in tremendous way. It's a low power, cost and high efficient. The monopole antennas are easy to use because of its small size, compatible shape and easy fabrication. There is only single band antennas are existing with the LoRa technology we proposed a dual band frequency monopole antenna to enhance the performance and flexibility of the technology to perform effectively in the field of wireless communications.

## LITERATURE REVIEW

In a literature many research are studied about the monopole antennas. Performances of the single and double band frequencies are analyzed by comparing efficiency of the antennas. A monopole antenna for the Industrial, Scientific and medicine applications is designed and size of the antenna kept small in size.[1]The antenna is designed to work at 900MHz GSM band and 2.4GHz ISM band achieving a good directivity.[2]Literature review on monopole antenna gives the enhancement of dual band from single is flexible in great efficiency.[3]

## ANTENNA DESIGN

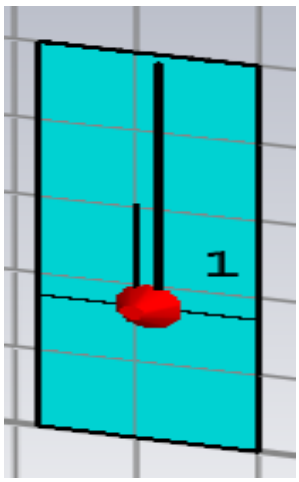


**Figure1: Structure of Designed Antenna.**

Antenna is designed and simulated using the CST Software. The discrete port is fed from ground to the monopole patch. Figure1 shows the structure of dual band monopole in which the shorter length tunes the 868MHz frequency and longer length tunes the 433MHz frequency. Figure2 shows the back view of the designed antenna.

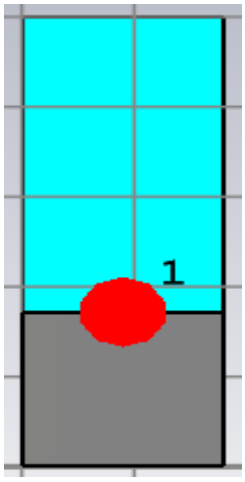


**Figure2: Back view of designed antenna.**

## RESULTS

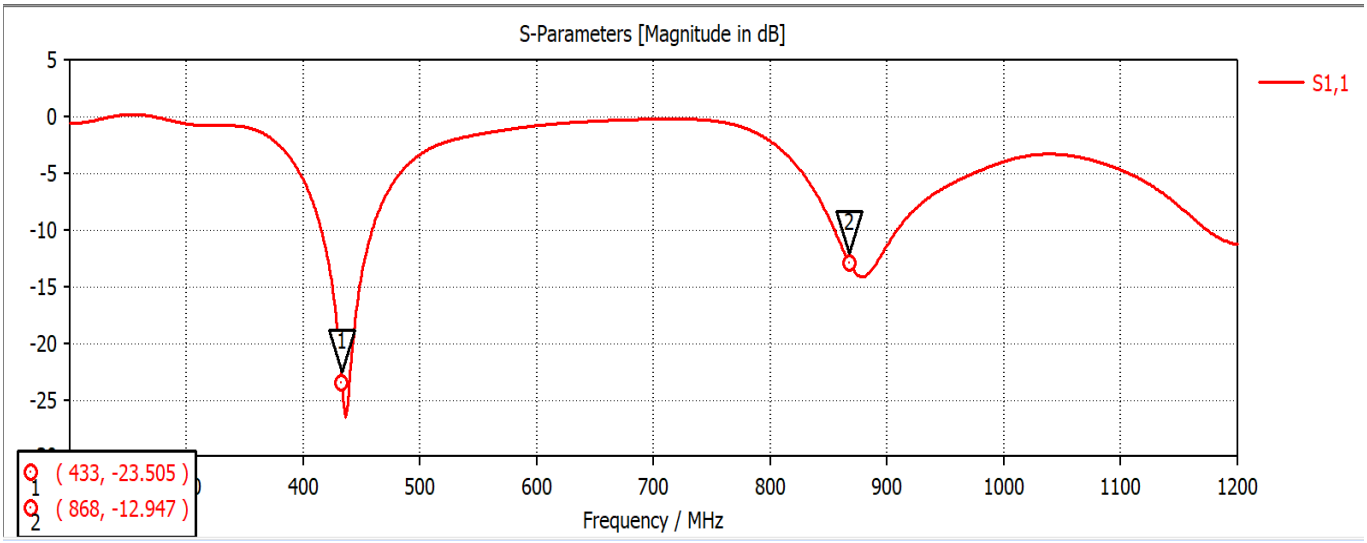


**Figure3: Return Loss (S11) of Designed Antenna.**

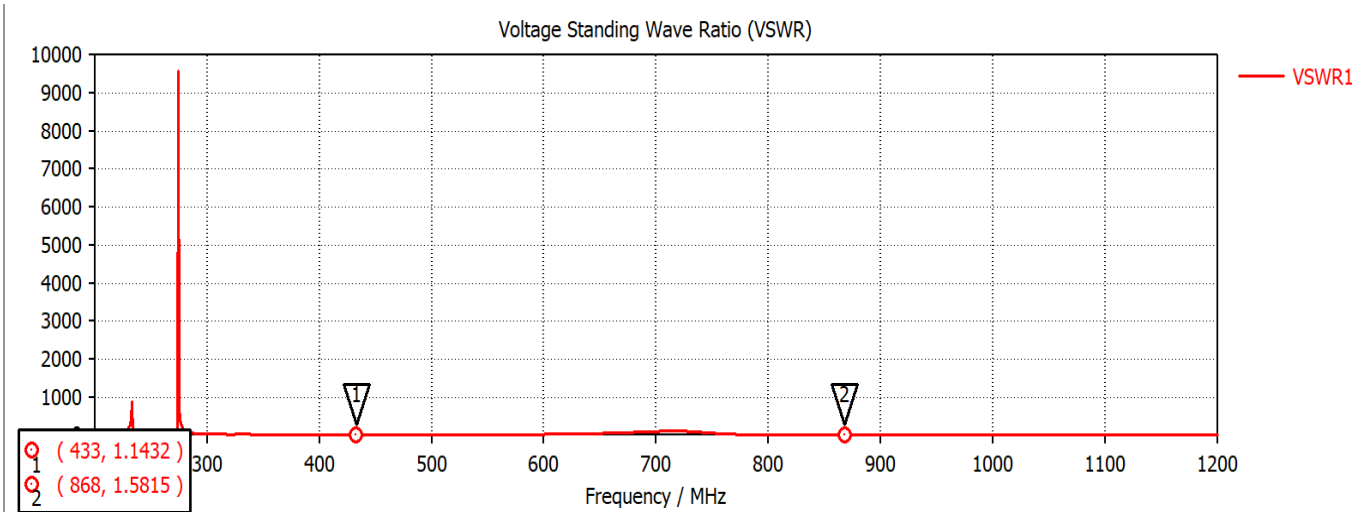


**Figure4: Voltage Standing Wave Ration (VSWR) of Designed Antenna.**

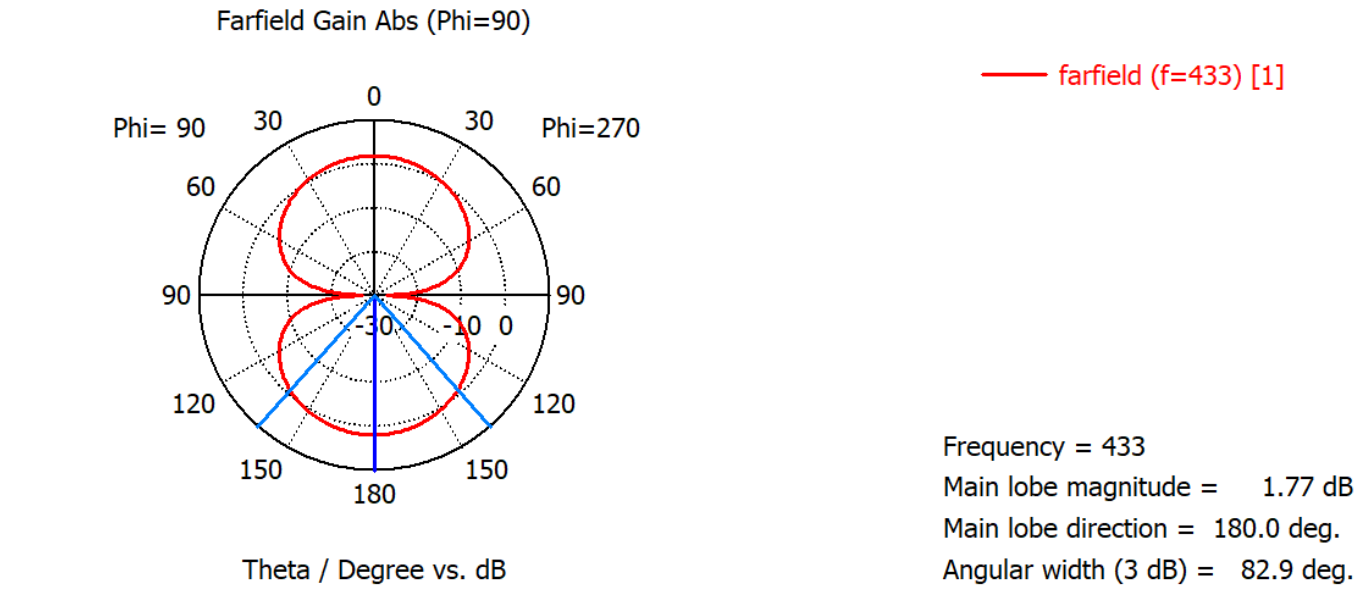


**Figure5: Radiation Pattern of Designed Antenna at 433MHz.**

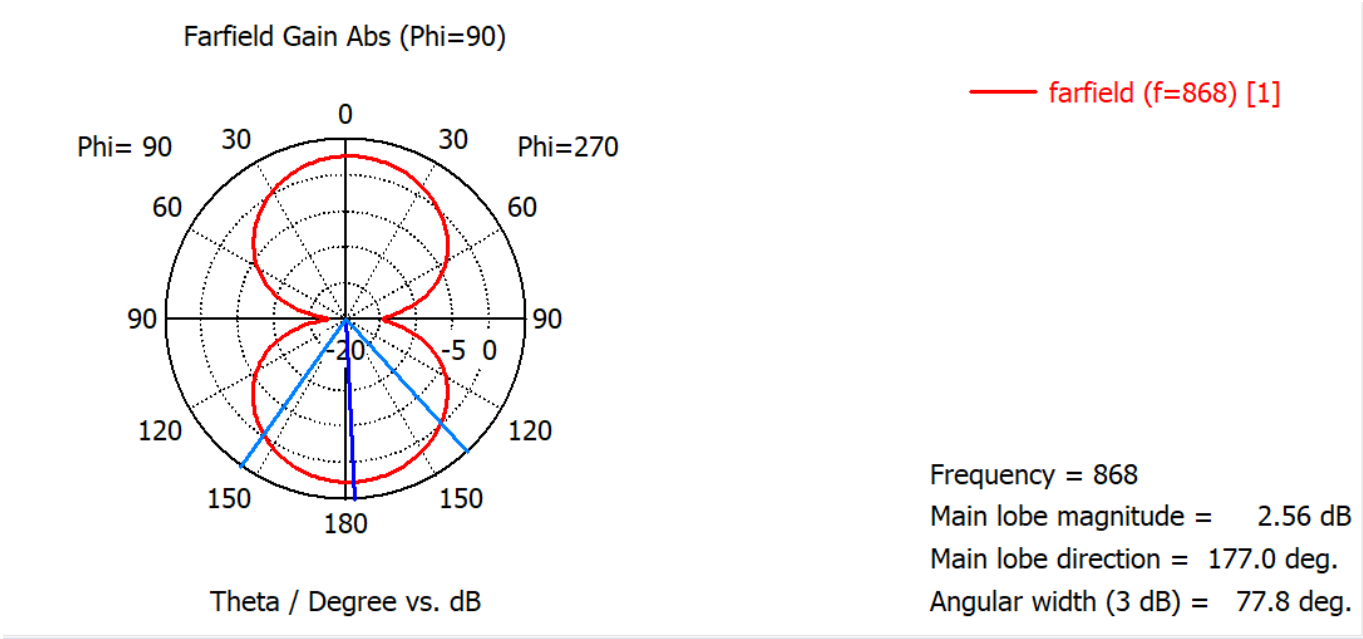


**Figure6: Radiation Pattern of Designed Antenna at 868MHz.**

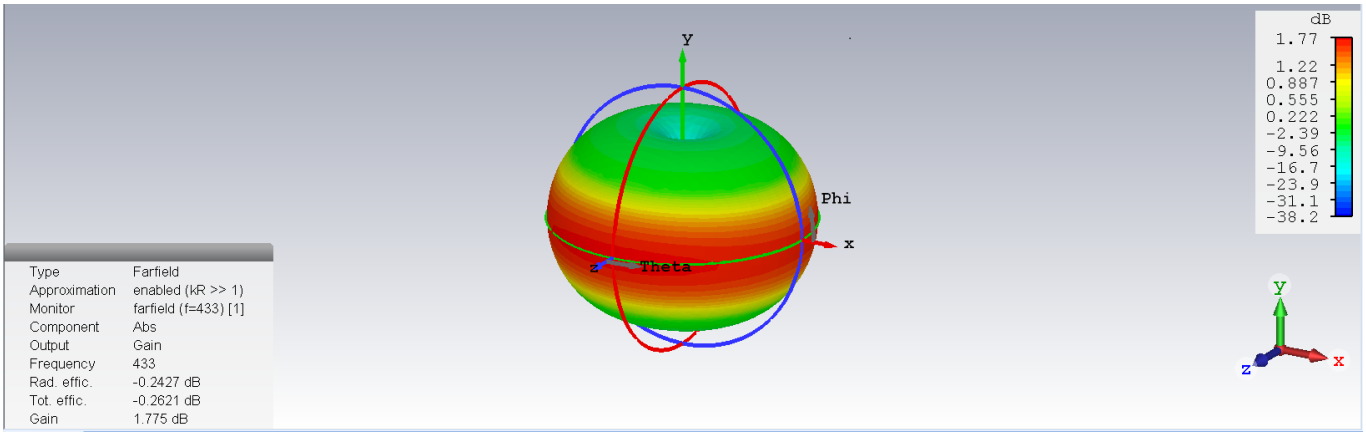


**Figure7: Far-field Gain Plot in 3D at 433MHz.**

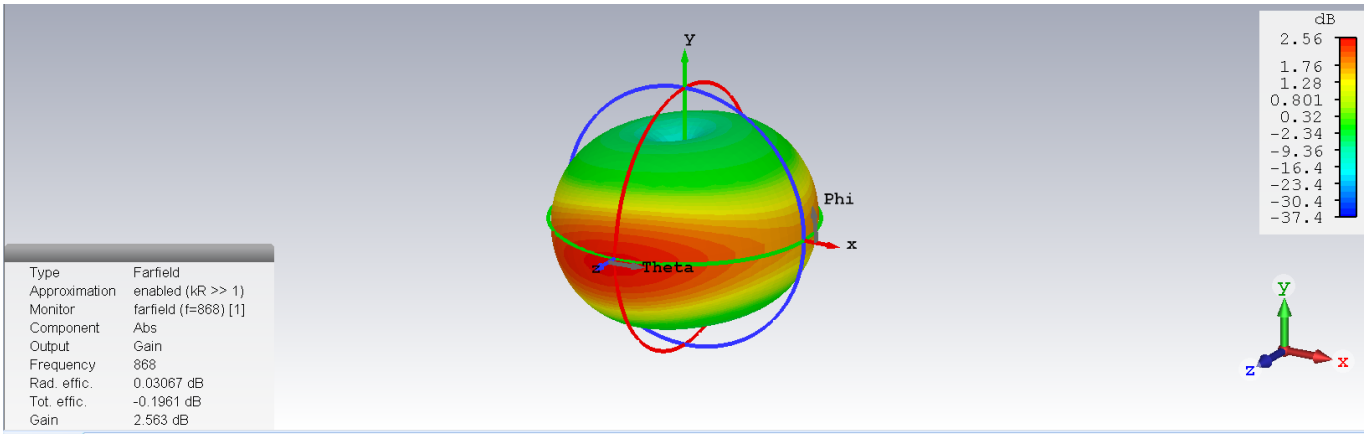


**Figure8: Far-field Gain Plot in 3D at 868MHz.**

## CONCLUSION

The Monopole antenna is designed to operate in double bands of Lora applications and simulated using the CST software. Proposed antenna meets the objectives of the design, low cost and simple structure.

- Designed antenna operates in 433MHz and 868MHz frequencies.
- Designed antenna achieves a return loss < -10dB at both frequencies.
- Achieves a Voltage standing wave ratio < 2 at both frequencies.

## REFERENCES

1. Prathibha T P, Jayanth C, SandeepVedagarbham, Pundaraja "Design of 915 MHz Monopole Antenna for ISM Applications using CST" International Research Journal of Engineering and Technology (IRJET) Volume: 05 Issue: 11 | Nov 2018; 1158-1160.
2. P. Jithu, A. Paul, V. Pithadia, R. Misquitta, U. P. Khot "DUAL BAND MONOPOLE ANTENNA DESIGN" International Journal of Engineering and Technology (IJET) Jun-Jul 2013; 5(3): 2297-2302.
3. PriyadarshiSuraj and Vibha Rani Gupta "Analysis of a Rectangular Monopole Patch Antenna" International Journal of Recent Trends in Engineering, November 2009; 2(5): 106-109.
4. Prathibha T P, Jayanth C, Mr. Sandeep Vedagarbham, Pundaraja "A Literature Review on Dual Band Monopole Antenna for LoRa Applications" International Journal of Scientific Development and Research © February IJSDR | 2019; 4(2): 296-299.