# Design of Wideband Monopole Flexible Antenna

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***Abstract*— A Compact wideband protean Planar Monopole Antenna is anticipated for conformal operations. The radio line is arranged using Teslin substrate of dielectric predictable2.23 and consistence0.712 mm. The arranged radio line works over a functioning reprise of13.78 GHz going from2.87 GHz to16.65 GHz to cover the distant correspondence advancement frequentness and veritably wideband reach for colorful far off implicit applications of the receieving line cover remote body region association, individual good observing, military and space and salvage fields, recreation and business operations.**

## I.INTRODUCTION

In current market there is a huge demand for flexible antennas which are used for various applications like Wireless Local Body Area Networks (WLAN), entertainment, business applications, used by special forces in army, space and research fields. According to the current trends the market for the flexible electronics is huge. The statistics says that in next 10 years the market for the flexible electronics is more than 400 billion USD. Monopole antenna with wideband technology with frequency of 900 MHz which is capable to transfer high data rates, monopole antennas with wideband as gathered interest due to their compact size, higher gain capabilities, transmission line impedance of 50 ohms. Recent trends in the automobile industries have raised concerns for more efficient, low power consumption, flexible and compact antennas to be designed in order to integrate this in mobile phones, laptops and watches etc.

This wideband monopole flexible antenna is fabricated on a Teslin substrate with thick 0.5 mm and dielectric values of Teslin is 2.23. The Teslin material or substrate is used because it is biodegradable, synthetic polymer which can be recycled, water resistant. which is stronger than any other coated paper. The radiated part of the antenna is rectangular in shape with total length 166mm.Teslin is the synthetic paper which it is durable More over it is waterproof material with high performance efficiency.

In this paper an original minimal wideband radio wire for conformal situations is given a trapezoidal shape planned on Teslin paper. The radio wire with aspects of 30 x 20 mm2, is intended to work structure 1.07 to 16.67 GHz recurrence range.[1]

## II. ANTENNA DESIGN

A full-wave recreation programming CST Microwave Studio is utilized to plan the antenna. which is one of the strategies for the arrangement of electromagnetic issues. This electromagnetic re-enactment programming is utilized for most exact and effective computational answers for electromagnetic designs. It involves CST apparatuses for the plan and improvement of gadgets working in a wide scope of frequencies.

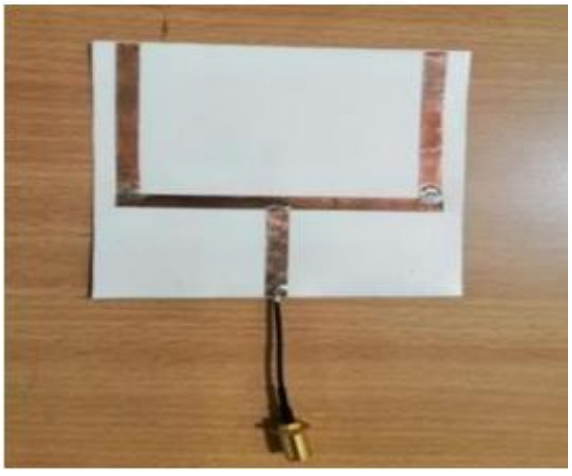

Fig: Antenna Front view Design

### A.Choice of Substrate

To match the necessity Teslin is employed as the substrate which is solid, secure and profoundly printable finagled paper made of Formulated with a polyolefin/silica frame to make a solitary subcaste,

microporous material, Teslin substrate cinches links colours, cements, coatings and covering flicks into its design, making solid ,principally imperishable securities and affiliated prosection helps that other finagled substrates cannot imitate. Furthermore, it tends to be reused and is environmental friendly, entry door for bio friendly hardware. The thickness of the teslin material is around 0.7mm.It has the dielectric constant of 2.23.


Fig 2: Teslin substate Inner Layers.

We can also use materials like jeans has an extremely low dielectric steady that lessens the surface wave misfortunes and expands the impedance transfer speed of the radio wire. Material can be utilized here is jeans its dielectric steady is 1.6. For incorporation into attire, receiving wires are for the most part required to have been little, feather light, and adaptable. They ought to have security and march protected to individual wellbeing when put close to the body, pants have this rate.

B.Geometry

Figure 1 and Fig. 3 displays the front view and the rear view of the radio cable connected next to its views. The proposed acquisition cable has mutt figures and is made using elliptical rings and a rectangular radiator. The lower plane is cut at the edges to obtain a trapezoidal shape to deal with the transmission of information. It also has rectangular effects added to further enhance the ability to transmit information to suit communication needs. The system is 30 x 20 mm2, using a Teslin Substrate. [3]

Fig 3: Rear view of the Antenna with Dimensions.

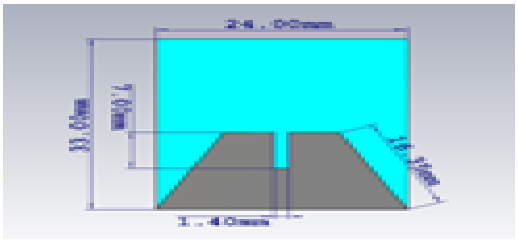

Fig 4: Rear view of the Antenna

C.Fabrication

The transmitting material is created on a Teslin paper with Perfect Electrical Conductor [PEC] thing. It is comprised of copper. It has a thickness of 0.035 mm. This incorporates manually made manufacture accordingly making it practical.

## III.SIMULATION DESIGN

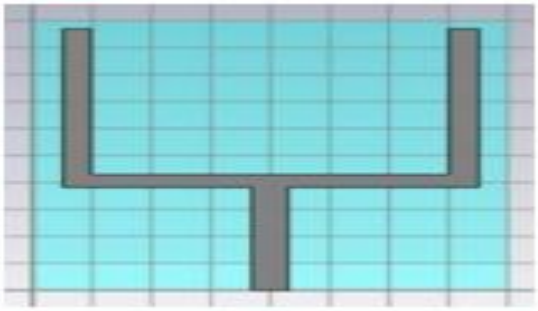

Fig 5: Radiator of proposed antenna

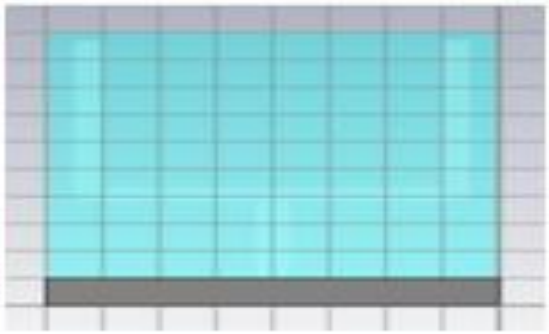

Fig 6:Ground Plane of proposed Antenna

Fig 7: Teslin substrate of proposed antenna

From above figures 5, 6 and 7 the design of antenna is completely changed. The total dimensions of the antenna can be reduced to 80x100mm, radiation part is rectangular in shape with thickness of 5mm on both sides of the radiator, ground plane dimensions are reduced to 10x80mm.By increasing the inductive loading on the radiator part we can achieved the required bandwidth of 1 GHz with maximum efficiency, peak gain of 1.6, good radiation pattern, improved Return loss, also 50- ohm impedance matching can be achieved. The rectangular ground plane with dimension 10x80mm is mainly responsible for characterizing the parameters of the antenna.

The design we obtained in the software is fabricated manually on Teslin substrate with copper material, because copper has minimum return loss, highly reactive, easily available, and low in price compared to silver and gold. Finally, port is created by soldering the ground plane at the tip of the feed.

## IV.CONCLUSION

Present days we are seeing rapid growth of flexible electronics like phones, laptops, watches etc. wideband trend is one of the best view of the wire-less interaction. This can be operated in lower power and effective in transmitting of high data rates. The thinkable applications of this flexible antenna are WBAN, walkie-talkie, rescue missions, health monitoring, military applications etc. In present days electronic waste is causing many environmental problems around the world by polluting air, soil, water. To overcome this problem, we designed antenna which is eco-friendly, non-toxic, and as we used Teslin substrate and copper material in hardware part both the materials can be easily recyclable.

## REFERENCES


[1] Zaiki Awang1, Nur A. M. Aendi, Nur A. L. Alias, and Nur M. Razali Flexible Antennas Based on Natural Rubber Progress In Electromagnet- ics Research C, Vol. 61, 7590, 2016.

[2] Latré Benoît et al., "A survey on wireless body area networks", Wireless Networks, vol. 17, no. 1, pp. 1-18, 2011.

[3] Chih-Yu Tsai and Oscal T.-C. Chen: Broadband Microstrip-Line-Fed Monopole Antenna

[4] Pranita Manish Potey Department of EXTC Engineering LTCE, Koparkhairne Navi Mumbai, India Design of Wearable Textile Antenna with Various Substrate and Investigation on Fabric Selection

[5] M.Pandimadevi, R.Tamilselvi, A. Saba Afroze, Design of Flexible Slot Antenna .

[6] N.I.Zaidi1, M.T.Ali1, N.H.A.Rahman1,2, M.F.Yahya3 , M.S.Amin Nordin1 , A.A.Sharatol Ahmad Shah1 Accurate Simulation of Fabric and Analysis of Antenna Performance on Different Substrate Materials.

[7] R.Tamilselvi, A. Saba Afroze, M. Parisa Beham Design of Flexible Slot Antenna using different substrate materials for UWB applications

[8] Subhadra Panda, Gode Sriram Kumar, Padidam Sankeerthana, Bibhudendra Acharya An Extensive Judgment of Rectangular Microstrip Patch Antenna with Flexible Substrates.

[9] M.Pandimadevi, R.Tamilselvi, A. Saba Afroze, M. Parisa Beham Design of Flexible Slot Antenna using different substrate materials for UWB applications

[10] Gode Sriram Kumar, Padidam Sankeerthana, Bibhudendra Acharya An Extensive Judgment of Rectangular Microstrip Patch Antenna with Flexible Substrates.

[11] Mrs. Punita Mane1, Dr. S.A Patil2, Mr.P.C.Dhanawade3 Comparative Study of Microstrip Antenna for Different Substate Material at Different Frequencies.

[12] Tapesh Bhandari EEE&I, BITS PILANI K Birla Goa Campus Goa, India An UWB Compact Microstrip Antenna for S Band, C Band and X Band Applications

[13] Jun Ho Kim, Tai Hwan Choi and Young Joong Yoon Department of Electrical Engineering Yonsei University Seoul, Republic of Korea : A Novel Multiple-Stub Ultra-Wide Band Antenna