DESIGN OF FORK SHAPED MICROSTRIP ARRAY ANTENNAUSING TRANSMISSION FEED LINE

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Abstract- *With a use of transmission line feedfork shaped array MSA is proposed for communication. Resonant frequency has been achieved by use of different length of patch. We try to achieve UWB (Ultra Wide-Band) and VSWR (Voltage Standing Wave Ratio). With the help of MoM based electromagnetic solver, IE3D, we are analyze the different parameters like return loss, radiation pattern, absolute gain (dBi) and VSWR for designed antenna. For communication, MSA design is very easy and avoiding attentionandUWB systems have raised renewed interest in broadband antennas. The authorized power levels of the Federal Communications Commission (FCC) mean that every decibel is important in the UWB system - as much or perhaps more than a standard narrowband system. Thus, the effective UWB antenna is an important part of the overall design of the UWB system.*

***Keywords* – Fork Shaped, Feed, Gain, Array,VSWR.**

I. INTRODUTION

UWB is an unlicensed short-range wireless communications system with the ability to deliver high capacity with low power compared to modern wireless systems for short-range applications. After the UWB is issued for an unlicensed application by the Federal Communications Commission (FCC) [1], it receives much less than the resonance frequency of the traditional antenna printed in the same patch area. Researchers are interested because of its inherent properties in low power consumption, high data rate and simple configuration. A microstrip antenna (also known as printed antenna) means a [2-5] antenna fabricated using micro-tape techniques on the PSB. Microwave frequencies are mostly used. The individual microband antenna consists of a patch of metal foil in various forms on the surface of the PCB with a ground strip of metal chips on the other side of the board. Most small tape antennas consist of multiple patches in a two-dimensional array. The antenna is usually connected to the transmitter or receiver via the small tape transmission lines [6-14]. Microstrip antenna is the most suitable device.

II. ANTENNA DESIGN

We design a fork-shaped array structure with four rectangular arrays array elements that are connected by the tape line and using a single feed line feed. We achieve the required resonance frequencies for our required applications and an antenna that applies to S-band and C-band microwave communications. We also connect all the elements of the array with a rectangular conical shape and this conical shape with the strip line connected to the edge of the patch and we use the transmission line feed to achieve the desired resonance frequency. The total track size of the array is 16 mm * 16 mm square with a PTFE FR4 substrate with a static insulator 4.4 and a height of 1.6 mm. All simulations are performed using an IE3D electromagnetic analyzer [21]. Figure 1 shows the proposed antenna structure.

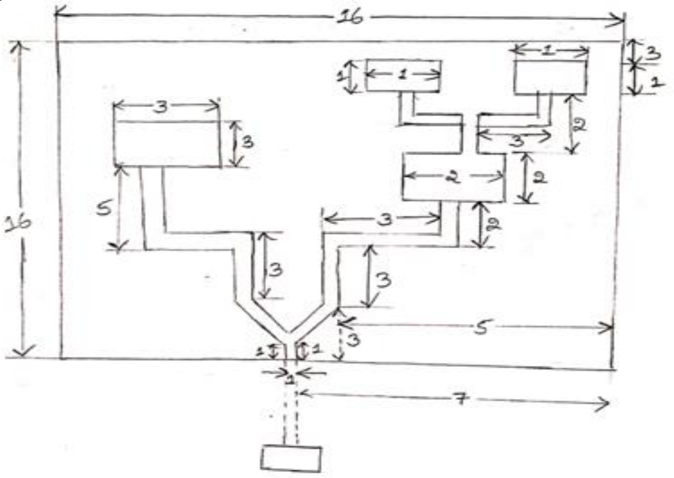

Fig 1:DESIGNED ANTENNA

III. RESULTS AND DISCUSSION

Here, many parametric analyzes of the antenna are made and made unavoidable for any UWB antennas. Analysis and optimization were done to get the best bandwidth resistance. Table 1 shows optimal antenna parameters, which clearly indicate that the frequency of designed antenna is 2.42 GHz with a return loss (S11) of about -15.59 dB and a second resonance frequency obtained at 7.30 GHz with a return loss of about -13.23 dB. The appropriate engineering choice for antenna parameters results in a different field distribution, which in turn affects the characteristics of the proposed antenna. Both resonance frequencies have no frequency range, but we get a sharp resonance frequency. Figure 2 shows the return loss of the proposed antenna. Figure 3 shows the VSWR diagram of the proposed antenna.

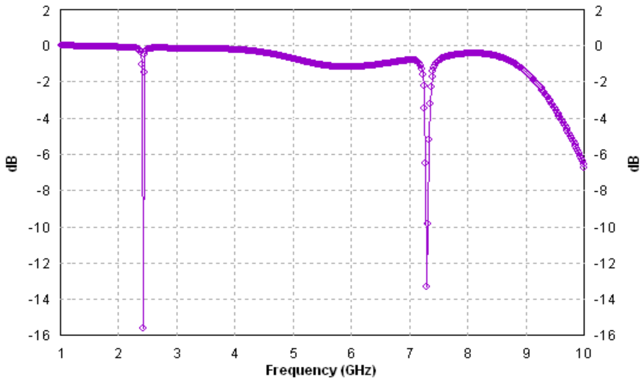

Fig 2:RETUN LOSS PATTERN

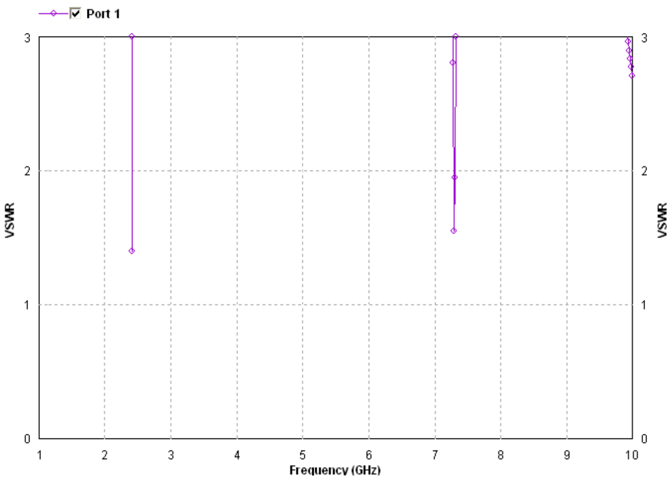

Fig 3:VSWR PATTERN

IV. SIMULATED RADIATION PATTERN

E-Plane and H-plane radiation pattern of proposed antenna for each resonant frequency is displayed on Figure 4 to Figure 7. Also smith chart of proposed antenna displayed in Figure 8.

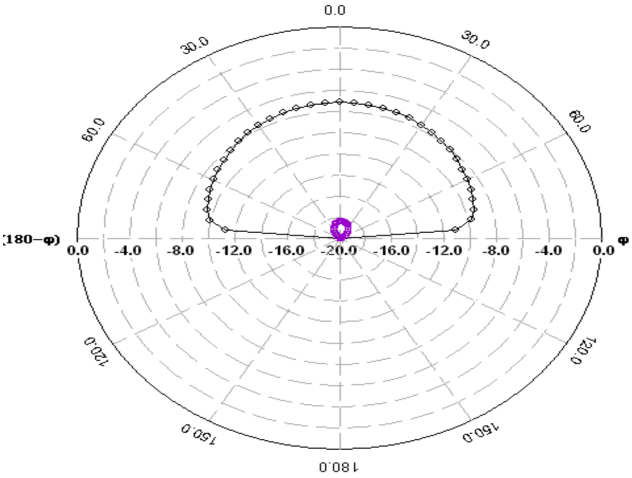

Fig 4:2.42 GHz Electric Field Radiation Pattern

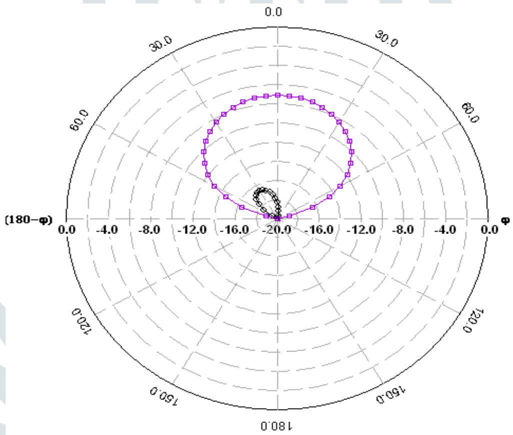

Fig 5: 2.42 GHz Magnetic Field Radiation Pattern

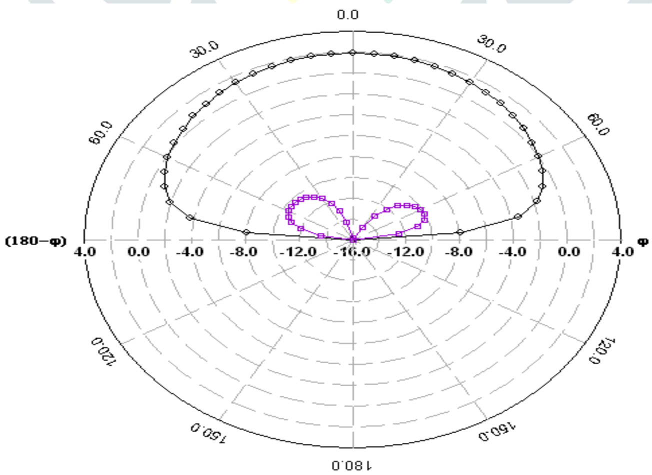

Fig 6:7.30 GHz Electric Field Radiation Pattern

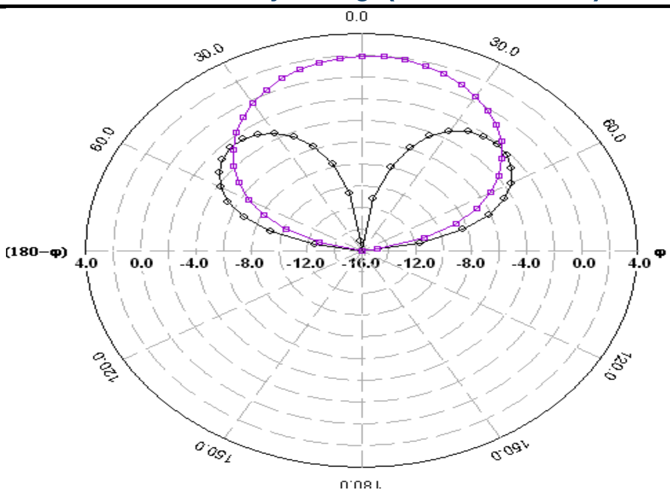

Fig 7:7.30 GHz Magnetic Field Radiation Pattern

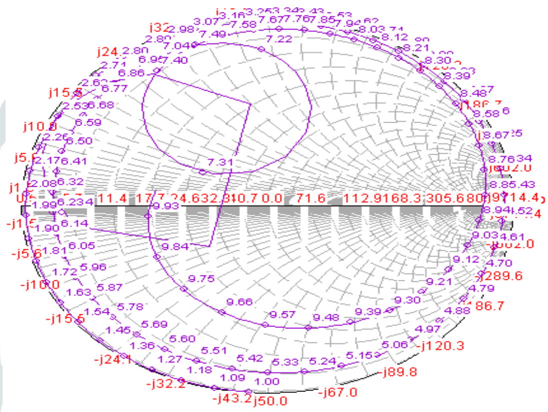

Fig 8: Smith chart Pattern

The results are shown in Table I and Table II which is discussed below:

TABLE I:RETURN LOSS with FREQUENCY

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TABLE

Frequency(GHz)	Return loss(dB)	VSWR
2.42	-15.59	1.42
7.30	-13.23	1.58

II:FREQUENCY with GAIN

Frequency (GHz)	Gain (dBi)	Frequency ratio	HPBW (deg)
2.42	-7.88	1	167.49^0
7.30	-2.71	3.016	165.89^0

V. CONCLUSION

One layer, one small antenna feeding feed transmitter that conducted simulation probes using the IE3D electromagnetic solver. When designing with a fork structure, a significant improvement is seen with a maximum return loss of about -15.59 dB and VSWR within the range of 2: 1. Another result was also observed with respect to the proposed antenna. About 167.49^0 is a package wide enough for the intended applications. If we change feed types, the results give a narrower bandwidth of 10 decibels and fewer signals.

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