# Graphene meandered dipole antenna for low-cost and flexible RFID application.

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Abstract

Radio Frequency Identification (RFID) technology has significant role in many applications such as controlling, detecting and tracking items in many primary sectors includes libraries, transportation, healthcare and pharmaceutical industry [1]. A graphene meandered dipole antenna on paper substrate for low-cost and flexible RFID application is presented in this work. Fig. 1 shows the top view of proposed graphene meandered dipole antenna. The meandered-line antenna has been chosen due to its low profile and simple structure [2]. Dimensions of antenna is chosen in mm range. Due to its unique properties, graphene is a promising material for RFID applications, compared to its counterpart such as CNT and copper. Conductivity of graphene is $10^8$ S/m and almost frequency independent in RF and microwave frequency regime [3]. Furthermore, graphene antenna on paper substrates makes the device flexible, which is significant for RFID application. Electric field distribution in the antenna is shown in Fig.2. Proposed antenna resonates at 890 MHz frequency, depicted in Fig. 3 (a). Radiation pattern of antenna is shown in Fig. 3 (b). From this Fig., we can observe that the proposed antenna presents omnidirectional radiation pattern.
The Proposed antenna provides 3 dB of gain, band width of 18% (820 -980 MHz) and omnidirectional radiation pattern, which reveals the promising potential of graphene meandered dipole antenna in low-cost and flexible RFID applications.

Figures

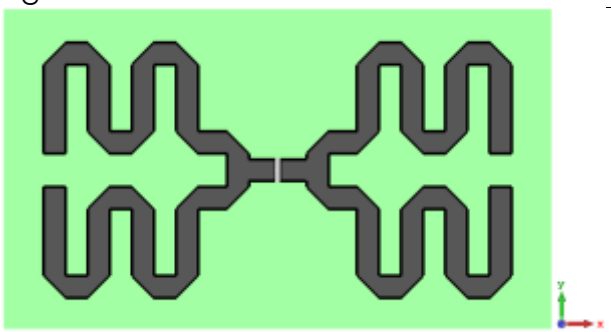


**Figure 1:** Top view of proposed graphene meandered dipole antenna

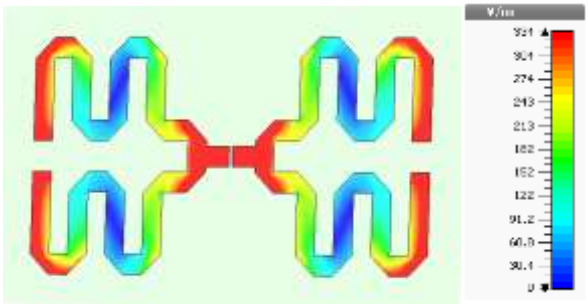
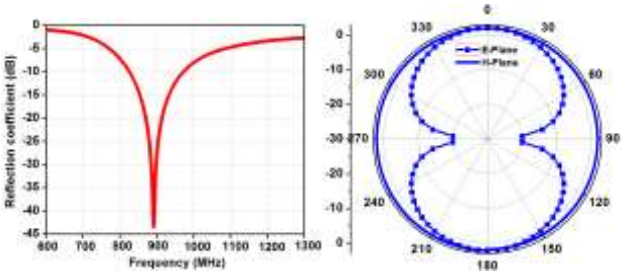


**Figure 2:** Electric field distribution in the proposed antenna




(a) (b)

**Figure3:** (a) Reflection coefficient and (b) radiation pattern at 0.79 GHz, of proposed antenna

References

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[2] G. Marrocco, IEEE Antennas Wireless Propag. Lett., 2 (1) (2003), 302-305.
[3] S. Dash and A. Patnaik, IEEE IAIM, 2017