

A PRINTED ELLIPTICAL DRIVER DIPOLE ANTENNA FOR WIRELESS COMMUNICATIONS

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ARTICLE INFO	ABSTRACT
Received: Revised: Approved:	<i>This work resents printed modified elliptical dipole antenna with a CPW-fed to CPS transmission. The proposed elliptical dipole antenna consiste of a CPW-fed to CPS transform, a pair of elliptical driver. The proposed antenna modified a conventional printed dipole antenna. The proposed antenna is realized a wide frequency bandwidth of 1.84GHz (4.72 – 6.56 GHz) at a return loss of less than -10 dB. The proposed antenna is able to support wireless communications applications.</i>
KEYWORDS	CPW-fed to CPS trasion line, Driver, Ellipticle driver, Wireless communications
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INTRODUCTION

This article presents a wide band frequency bandwidth for wireless communications of ISM (industry, science and mediacl) band and CV2X (cellular vehiecle everytings). The proposed dipole antenna modifies a driver of a planar dipole antenna. The proposed elliptical driver replaces a planar driver. The proposed elliptical driver consists of a folded driver arm. It is a good matching impedance between a CPS transition line and the elliptical driver because a folded structure is obtained wide range of an impedance. Also, the proposed antenna emploies a feeding way of a CPW to CPS trasion line. It has obtained a wide frequency bandwidth. This work more compacted antenna than a typical planar dipole antenna

DESCRIPTION ELLIPTICAL DRIVER DIPOLE

As show figure 1, the proposed elliptical dipole antenna consists of folded elliptical driver and the CPW-fed to CPS transition line. The proposed elliptical driver dipole antenna is printed a single face on a dielectric substrate of 0.64 mm with $\epsilon_r=3.5$. The CPW-fed and a parallel strip line are optimized to obtain a characteristic impedance of 50 Ω . The elliptical driver is a similar a quater wavelength ($=\lambda/4$, 5.8 GHz). The dimensions of the proposed dipole antenna is 54 × 50 × 0.64 mm, which is much shorter than a conventional planar dipole antenna.

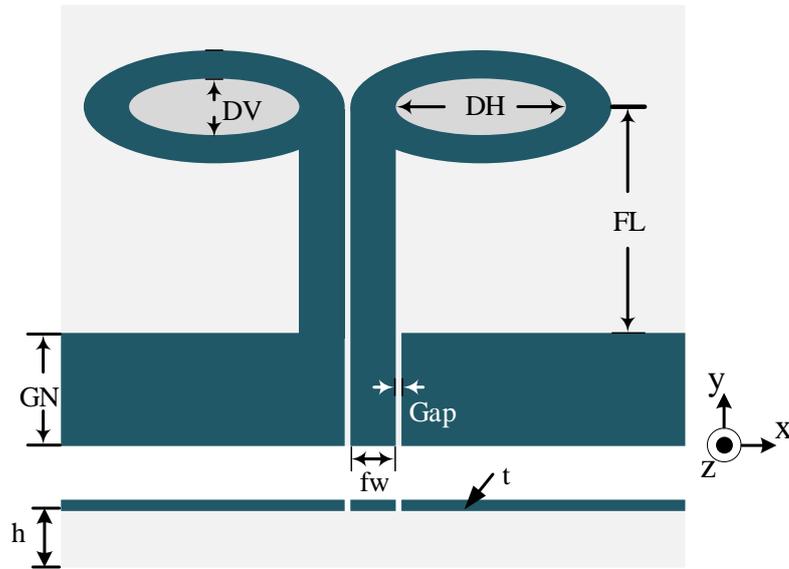


Figure 1. Geometry of the proposed dipole antenna.

RESULT AND DISCUSSION

This work is analyzed characteristics of an antenna such as a return loss, impedance, radiation patterns, and electrical current paths.

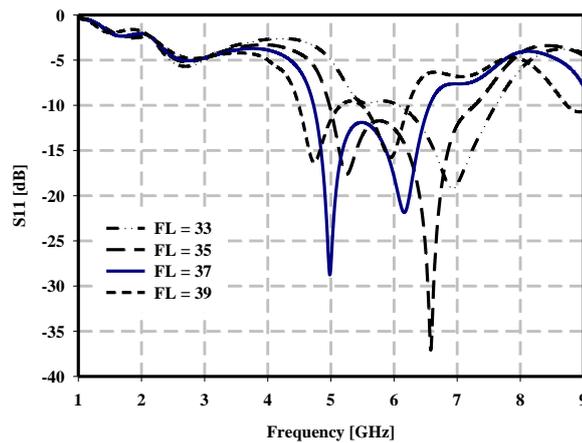


Figure 2. Return loss for changing FL.

Figure 2 shows a return loss of the proposed antenna and it optimizes the return loss according to changing FL. Here, FL is a parallel strip line of CPS transition line. The optimal length is 37 mm, as shown in figure 2.

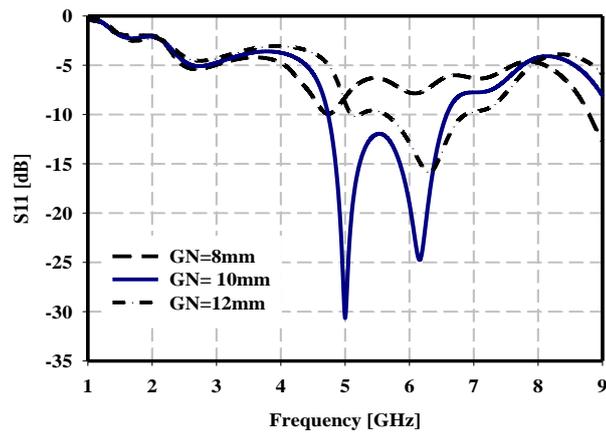


Figure 3. Return loss against a variable GN.

Figure 3. compares a return loss with regared to changeing GN. GN is a ground plane of a CPW-fed and it gives a stability of a feeding signal at a input face. When GN is 10 mm, the proposed antenna yields an optimum return loss. The operating frequency band is from 4.72 GHz to 6.56 GHz.

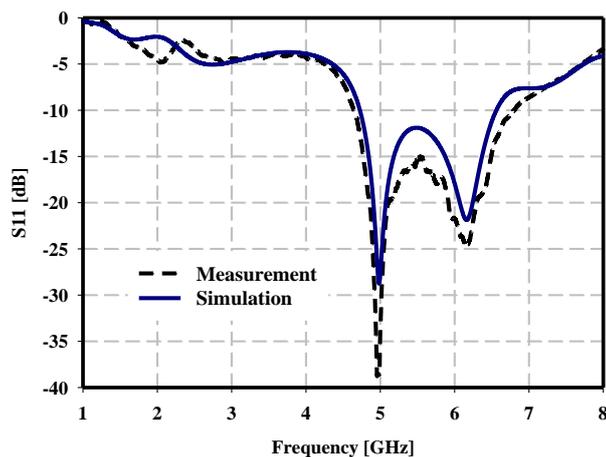
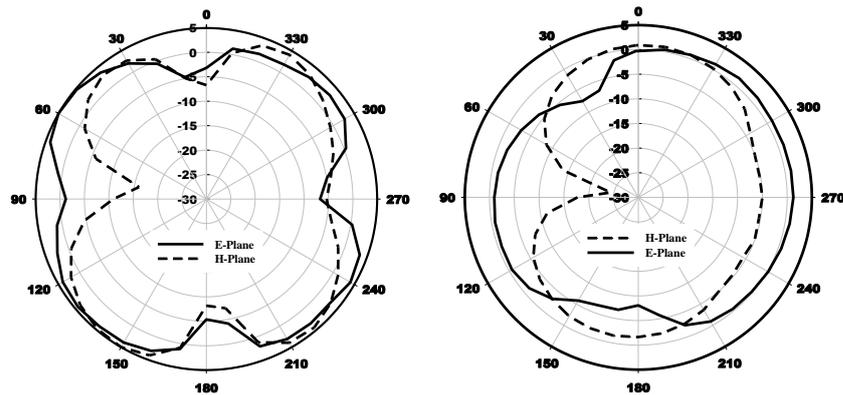


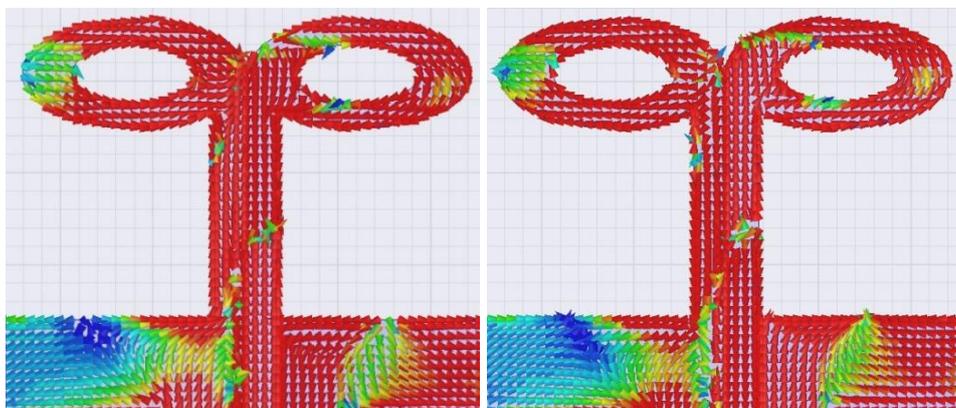
Figure 4. Measured and simulated return loss.

Figure 4 shows a measured and a simulated return loss of proposed antenna. As show in figure 4, the both return loss show an approximate characteristic. The proposed antenna yields a bandwidth of 1.84 GHz.



(a) Azimuth-Plane, (b) Elevation-Plane
 Figure 5. Measured radiation patterns of the proposed antenna.

The radiation patterns of E-field and H-field for an azimuth and an elevation plane at 5.8 GHz are shown in Figure 5. The proposed antenna appears a characteristics of a monopole radiation patterns. It reasons that the size of the proposed antenna is smaller than an operating wavelength.



(a) Current path at 30⁰, (b) Current path at 210⁰
 Figure 6. Simulated electrical current path at 30⁰ and 210⁰ of proposed antenna.

Figure 6 shows an electrical current paths and their directions at phases of 30⁰ and 210⁰. They flow same directions each phase of of 30⁰ and 210⁰ on a pair of driver. Also, they appear that the electrical current paths flow an oppoie direction of 180⁰. It is a characteristic of a dipole antenna.

Table 1. Parameters of the proposed antenna (mm).

Parameter.	Value.
FL	36
FW	4.2
DV	9
DH	15.6
GN	10

Table 1 is a list of parameters of the proposed antenna. The list is optimized to obtain the ptimum parameters.

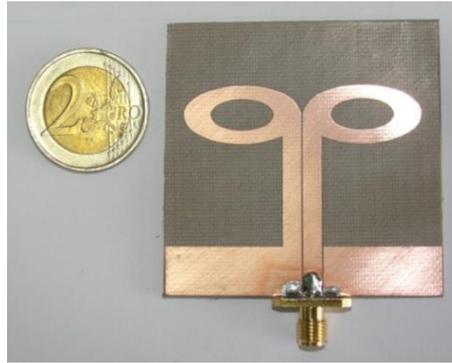


Figure 7. Manufactured photograph of the proposed antenna.

Figure 7 shows a photograph of the manufactured antenna. The manufactured antenna is connected to SMA connector. SMA does role in interfacing between the antenna and a test equipment.

CONCLUSION

This work presented a printed Elliptical driver dipole antenna. The proposed antenna accomplished a compact and a widebandwidth. The proposed antennas obtained a gain of 3.2 dBi and the bandwidth was 1.84 GHz (4.72-6.56 GHz). The frequency utilization coefficient was 33%. These properties could satisfy the ISM band and WLAN operations.

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