Current Distribution Analysis of Bowtie Antenna for GPR Applications using Method of Moments

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Index Terms—component, formatting, style, styling, insert

I. Introduction

The present era belongs to wireless technologies. The demand for wireless devices and wireless communication is increasing day by day. Hence, there's a growing need for a more effective utilization of the radio spectrum. Initially designed for radar applications, Ultra-Wideband (UWB) technology has transformed, becoming indispensable in the Wireless Personal Area Network (WPAN) and Wireless Local Area Network (WLAN) sectors as a rapid networking solution tailored for transmitting burst data. UWB antennas are becoming popular due to their numerous superior qualities. Ground Penetrating Radar (GPR) is a significant application of UWB technology, extensively used in both military and civilian sectors for tasks such as landmine detection [1], remote-sensing, and detection of trapped individuals beneath debris or in obscured environment [2]. For UWB GPR systems, Bowtie antennas are one of the most popular antennas because they reduce ground susceptibility during GPR operations [3]-[5]. Much research has been done on the performance enhancement of the Bowtie antenna to use it for GPR applications. Different types of resistive loading [6]-[9] is used to increase the bandwidth, forward gain, and efficiency of the antenna. A monolithic Bowtie antenna [10] using geometric morphing is designed for GPR applications. To achieve a wide beam width and unidirectional radiation pattern, a slot and a reflector are incorporated into the antenna structure [11]. Also, a modified bow-tie antenna with a shielded back cavity is proposed to attain an omnidirectional radiation pattern, particularly suited for GPR applications [12].

However, there has been very little study on the current distribution of the Bowtie antenna. In [13], the authors have shown the current density plot for a receiving antenna when the electric field is perpendicular to the antenna axis, but there is no plot for the current density when the electric field has the same polarization as the axis of the antenna.

The current distribution of any antenna is a very important parameter because, once the current distribution is known, we can calculate the field of the antenna anywhere in space.

In this paper, we will analyze the current distribution of a Bowtie antenna using MoM with RWG basis functions and validate the results by comparing them to the existing literature and some other software.

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$$a + b = \gamma \tag{1}$$

Be sure that the symbols in your equation have been defined before or immediately following the equation. Use "(1)", not "Eq. (1)" or "equation (1)", except at the beginning of a sentence: "Equation (1) is . . ."

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- The word "data" is plural, not singular.
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- A graph within a graph is an "inset", not an "insert". The
 word alternatively is preferred to the word "alternately"
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- There is no period after the "et" in the Latin abbreviation "et al.".
- The abbreviation "i.e." means "that is", and the abbreviation "e.g." means "for example".

An excellent style manual for science writers is [?].

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TABLE I
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^aSample of a Table footnote.

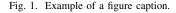


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ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression "one of us (R. B. G.) thanks ...". Instead, try "R. B. G. thanks...". Put sponsor acknowledgments in the unnumbered footnote on the first page.

REFERENCES

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For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [?].

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