Retraction

Retraction: Directivity Enhancement in UWB Microstrip Patch Antenna (J. Phys.: Conf. Ser. 1916 012186)

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This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the Problematic Paper Screener [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:2107.06751v1

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Directivity Enhancement in UWB Microstrip Patch Antenna

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Abstract. A portable Ultra Wideband (UWB) antenna for wireless applications. The ground plane of the intended antenna seems to have an extra open-ended inverted slot. The antenna has a good radiation pattern, propagation pattern, impedance bandwidth, and gain, and it can operate in the frequency range of 3.1-10.6 GHz, which is perfect for UWB applications. The antenna is small, measuring 38.87 x 24.00 mm2. The proposed antenna is ideal for wireless applications because of these features.

1. Introduction

Any wireless communication system will be incomplete without antennas. Although the antenna as a product is not new to the average person in today's world, knowing the history concepts involved in its operation would undoubtedly aid in the design of new flexible antennas to meet the stringent requirements of wireless communication engineers. A transmitting antenna sends the transmitter signal energy into space, and a receiving antenna picks up the RF signal from space [1].

Microstrip antennas are increasingly common in cell phones. Patch antennas are cost effective and offers build compactivity [2]. The antenna efficiency will suffer if the height h is less than 0.025 of a wavelength (1/40th of a wavelength). The input impedance of the antenna controlled by width. Increased bandwidth can also be achieved by using wider widths.

A square patch antenna fed this way would have an input impedance of about 300 Ohms. The impedance can be reduced by increasing the distance between the two points [3]. Lowering the input impedance to 50 Ohms, on the other hand, still necessitates using a big patch antenna. The width influences the radiation pattern as well. It has around 6 dB directivity [4].

Microstrip line feed

It is a microstrip patch feeding technique in which the conducting microstrip feed line is directly attached to the microstrip patch [5]. The dimensions of the feed line are different than microstrip patch. It's simple to make and fit. The patch extends beyond the conductor strip. As a result, the feed may be engraved on the same substrate as the substrate, resulting in a planar structure [6].

2. Antenna design:
FR – 4 is most commonly used substrate for antenna, over which is build. A radiating patch on one side and a ground plane on the other make up the antenna [7]. The antenna is fed by a microstrip line, and a rectangular close ended slot is cut out of the radiating patch’s middle as shown in Figures 1 and 2. The proposed antenna was built in the frequency range of 3.1GHz-10.6GHz. The proposed antenna generates a notch band with a frequency range of 3.89-5.93GHz.

CST software is used to develop the UWB antenna for wireless applications. The middle and radiating patch are cut into a rectangular close-ended slot [8].

![Figure 1. Front view design of UWB Antenna](image1.png)

This is the UWB antenna's front view. A rectangular slot is eliminated to reduce the patch area and maximise bandwidth. In addition to this slot, an open-ended slot with a width of 3.00 mm and a length of 2.32 is engraved [9-13]. The antenna's radius is 12.00 mm. A circular patch is drawn within the rectangular slot to increase the antenna's total radiation. This circle has a radius of approximately 4.00mm.

![Figure 2. Back view design of UWB Antenna](image2.png)

3. Measurement Parameters

Radiation Pattern

The Radiation pattern of an antenna represents the energy radiated by the antenna. Radiation Patterns are diagrammatical representations of radiated energy distribution in space as a function of direction. Field patterns or power patterns are two types of radiation patterns. Field patterns as a result of electric and magnetic fields are plotted. On a logarithmic scale, they are plotted. The power patterns...
are plotted as a function of the electric and magnetic field magnitudes squared. They're typically plotted on a logarithmic or dB scale. In antenna theory, gain is one of the realised quantities. Benefit is less than directivity in general. There are ohmic and other losses introduced. It is calculated by dividing the antenna's radiation strength in a given direction by the total input power it accepts.

4. Result and Discussion:

The end result is represented as a line. The antenna has a -10 dB bandwidth and wideband characteristics. The S-parameter graph obtained from the UWB antenna configuration is as follows:

The far field pattern of the UWB antenna has been achieved. Band-stop effect caused at 5.50 GHz current occurred around L-shaped slot, adjacent walls has opposite currents. The group delay has monopole-like characteristics, stays within acceptable bandwidth limits and deviated as shown in Figures 3 and 4.

![Figure 3. S-parameter result of UWB Antenna](image1)

![Figure 4. Radiation pattern of UWB antenna](image2)

The existence of an L-shaped slot reduces the height of the peaks. The antenna has a high gain and a broad impedance bandwidth. Figure 5 shows the proposed compact UWB antenna configuration for wireless applications, because of low as -10 dB return loss and 3.1 – 10.6 Ghz band.
5. Conclusions

Depending on the slot dimensions, a lightweight UWB antenna for wireless applications is presented. The planned antenna's overall dimensions are 38.87 x 24.00 mm². An additional open ended is etched out in the ground plane to achieve band notch characteristics in the 3.89 to 5.93 GHz spectrum. The proposed design has a maximum gain of 8.17 dBi at 9.5GHz. Based on the measured results, the antenna exhibits good radiation characteristics across the UWB area, with the exception of the notched field.

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