



The Chinese University of Hong Kong
Non-confidential Abstract of Technology Disclosure

Title:

A Compact Meander-Line Inverted-F Antenna

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Inventor(s):

Professor WU Ke Li, Department of Electronic Engineering

Patent Status:

- ◆ US Patent no. 7,183,976
- ◆ Canadian Patent Pending
- ◆ Chinese Patent Pending
- ◆ Hong Kong Patent Pending

Non-confidential abstract:

With increasing demands on commercial short range data transmission applications such as Bluetooth module and RFID tag application, tremendous attention has been attracted on an ultra compact integrated antenna with good matching performance. Two popular antennas are the Inverted-F Antenna (IFA) and meander-line antenna. Although a meander-line antenna itself occupies a very small volume, because it is preferred to be mounted perpendicularly to the ground edge of a circuit board, the actual area occupied by a meander-line antenna is still large. IFA, on the other hand, is a low profile antenna and can be installed in parallel to the ground edge and therefore saves space. However, the length of the radiator needs to be about one quarter free space wavelength. Although many methods have been developed to reduce the length of IFA, such as folded IFA and capacitive loaded planar IFA, to meet the increasing requirement on miniaturization, while maintaining the required bandwidth, a further dimension reduction is needed.

A novel compact Meander-Line Inverted-F Antenna (ML-IFA) that can be optimally built by means of Low Temperature Co-Fired Ceramic (LTCC) technology has been developed. The proposed antenna uses a section of meander-line to replace the straight radiator in IFA. With the meander-line radiator, the length of the proposed antenna can be significantly reduced to as low as less than $1/12\lambda_0$. In the same time, the proposed antenna still retains its low profile feature. Having the same physical length of the resonance surface current, the proposed antenna has similar radiation efficiency as that of a meander-line antenna. Though the reduction of the antenna size degrades the bandwidth of the proposed antenna as compared with IFA, practical design results show that by adjusting the height of the meander-line antenna, more than 150MHz bandwidth at 2.45GHz, or more than 6% of bandwidth, can be achieved, which is sufficient for most of short-range data transmission applications.

For further queries, please contact:

Mr Billy Lam
Technology Licensing Coordinator
Tel: (852) 2609 8882
Fax: (852) 2603 5451
Email: billylam@cuhk.edu.hk

Address:
Technology Licensing Office
The Chinese University of Hong Kong
Room 226, Pi Ch'iu Bldg, Shatin, New Territories
Hong Kong SAR