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DESIGN OF TRI BAND MIMO SYSTEM FOR WIRELESS APPLICATION

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ABSTRACT

A tri band multiple input multiple output (MIMO) antenna that covers all frequency bands required for WLAN and WiMAX applications is presented. Three resonant bands are achieved by a folded monopole with a compact size of 11.5 × 15.6mm2.In that here we are using microstip patch antenna.The MIMO system consists of two symmetrically placed monopoles.A stepped slot ended with an ellipse on the ground plane is etched to reduce the mutual coupling between the two monopoles.The overall dimension of this MIMO system is 50 × 50mm2. The prototype of the antenna is fabricated and measured.The 4G expansion firstly demands to construct infrastructures and devices of 4G systems, in which the antenna is an essential part of 4G devices, especially mobile phones. The antenna has to be designed to meet both frequency bands for this new technology and limited size to fit the required housing. By using HFSS tool the antenna is designed.

I.INTRODUCTION

The MIMO technology, characterized by using multiple antennas as transmitter and receiver, exploits the multipath property to improve the communication quality, increase the system capacity and achieve high data rates . With these advantages, MIMO technology has been introduced to portable terminals such as laptops, mobile phones, USB dongles and others to realize high-speed data transmission

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.In the design process of the MIMO antennas for WLAN/WiMAX, the main challenge is to ensure sufficiently wide bandwidth to support WLAN/WiMAX application while maintaining high isolation between the antenna elements within a compact size. Three operating bands are achieved by inserting a pair of T-shaped strips into a wide rectangular slot in. In, a modified F-shaped slot antenna for WLAN/WiMAX is presented. But the bandwidth of these antennas is not enough to cover the whole band for WLAN/WiMAX. The mutual coupling less than −15 dB was achieved through the two grounded branches. A T-shaped parasitic element was added on the ground plane in to reduce the mutual coupling. In, the elements of the system are placed vertically to obtain high isolation. However, the isolation in most of these letters is not high enough. In this letter, a compact MIMO antenna for WLAN/WiMAX application is presented. Two modified C-shaped monopoles are symmetrically placed upon a same ground to form a MIMO system. The three resonant bands achieved by the folded monopoles are 2.3–2.75 GHz, 3.4–3.75 GHz, 4.8–6 GHz, utilizing a limited space of 11.5×15.6mm2.A stepped slot ended with an ellipse is etched on the ground to mitigate the mutual coupling.

II.EXISTING SYSTEM

A dual-antenna system for smart phones with Long Term Evolution (LTE)/Wireless Wide Area Network (WWAN)/Wireless Local Area Network (WLAN)/Worldwide Interoperability for Microwave Access (WiMAX) operations is presented and studied. The proposed dual-antenna system consists of two symmetric antenna elements and a folded dual inverted -shaped ground branch (FDILGB). Each antenna element includes a driven branch and a parasitic ground branch. To improve the antenna efficiency, the parasitic ground branch is studied and optimized. The FDLGB is applied to reduce the mutual coupling between the two closely spaced antenna

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elements and achieve better impedance matching. The measured operating bands with lower than -6dB cover 698-974and 1699-4019MHz for the fabricated prototype. Within the operating bands, the measured is lower than 10dB. Based on the measured 3D radiation patterns, the envelop correlation coefficient, the mean effective gain and the diversity gain of the proposed dual-antenna system are calculated, and good results are obtained.

DISADVANTAGES

- Operating Band width range supporting less compared to proposed system.
- It supports up to 3.4GHz frequency.
- size is little bit larger (132x80 x0.8 mm^2)

EXISTING BLOCK DIAGRAM

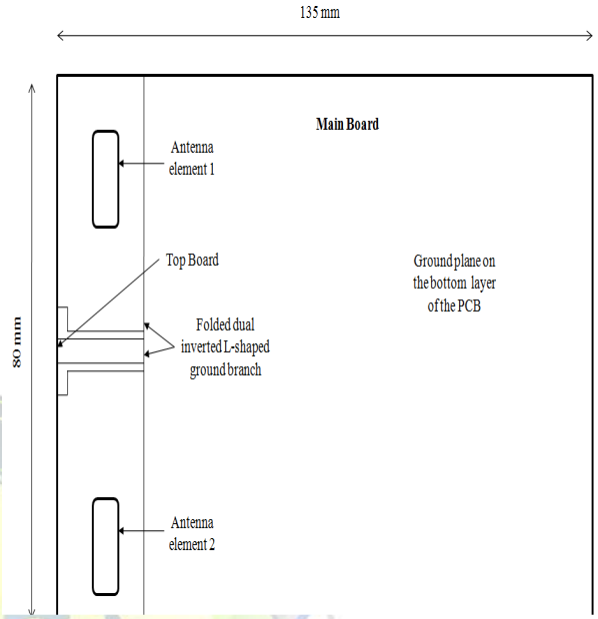

Fig. 1 Block Diagram of Existing System

III.PROPOSED SYSTEM

A compact low profile multiple antenna system for multiple input multiple output (MIMO) applications is proposed. The antenna system combines two monopole type printed antennas with a slotted ground plane for low correlation and high isolation characteristics. The main antenna covers the twelve wireless communication bands required for LTE, GSM, UMTS2110, Bluetooth, WiMAX and WLAN. The auxiliary antenna has a very small volume compared to the main

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one and covers the ultra-wideband (UWB) frequency range (3.74-12 GHz).

The antennas are positioned at opposite ends of the system's ground in order to reduce the mutual coupling between them. The isolation maintained is better than 20 dB over the desired frequency bands, resulting in an envelope correlation coefficient of less than 0.08. The simulation results show good S parameters, high gain and radiation efficiency, and relatively stable radiation patterns. Due to the compact size and the ultra wide bandwidth, the proposed multiple antenna system is suitable for communication handsets that have size limitations. Results are presented and discussed.

PROPOSED BLOCK DIAGRAM

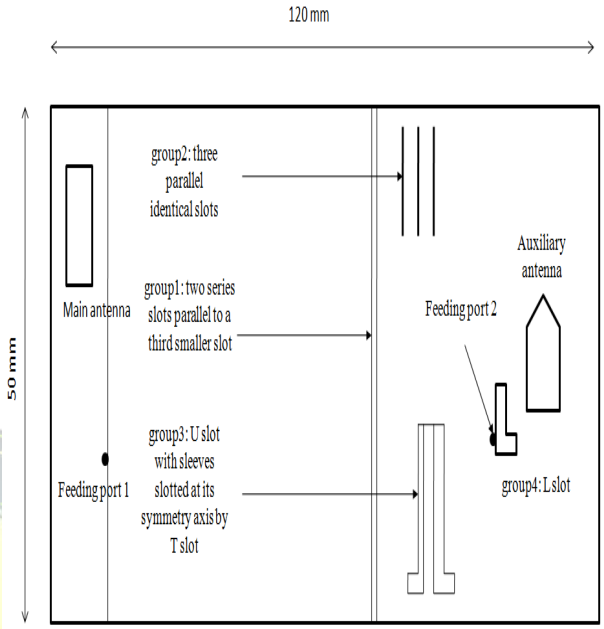

Fig. 2 Block Diagram of Proposed System

ADVANTAGES

- Operating Band width range supporting 20dB.
- It supports up to 12GHz frequency
- Size is small (120x50x0.8 mm^2)

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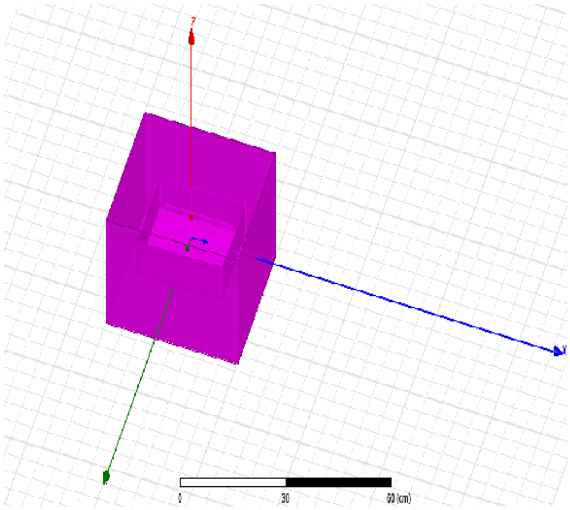
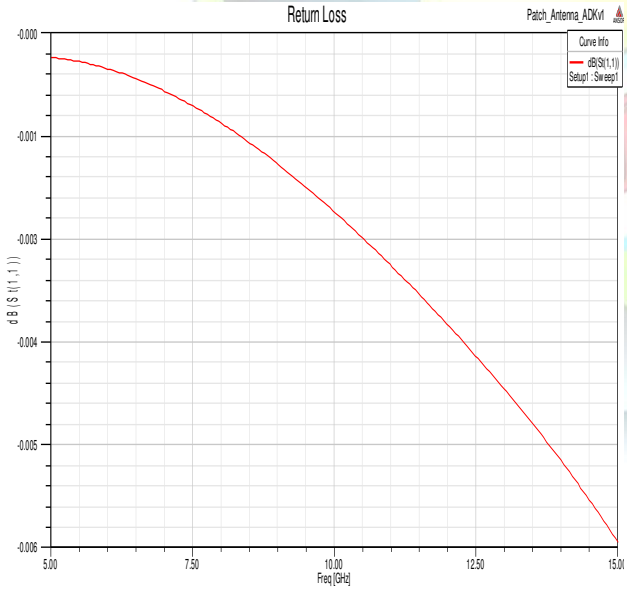


(a) Simulation of the patch antenna



(b) Return Loss of Patch antenna

IV.CONCLUSION

A novel multiple antenna system with an intelligent decoupling technique for high isolation better than 20 dB. The system consists of two planar printed compact monopole antennas with a decoupling filter among the system ground plane to accomplish ECC below 0.08 over the entire frequency bands. Antenna performances with and without the proposed decoupling filter have been listed. The proposed design covers all the standard operating bands in the Frequency range 0.5-12 GHz for LTE, GSM, UMTS, ISM, WiMAX, WLAN and UWB for both mobile and internet applications.The presented decoupling filter design can be can be applied to different multiple antenna or MIMO systems.

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