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Review paper on Techniques and Design of Compact slot antenna for Multiband Application

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Abstract *- Acompact handheld communication devices has grown significantly.Microstrip slot antenna is mostly used in modern communication devices mainly because of their size.In this review paper a survey is conducted on techniques and design used in microstrip slot antenna papers which has been used by authors for designing of an efficient, low profile, small, affordable, compactmicrostrip slot antenna mainly used for multiband application.Slot insertion causes size reduction which increases the bandwidth and return loss.*

Keywords-Slot, WLAN, Wi-MAX,DCS,PCS,UMTS.

I. INTRODUCTION

Antenna is very useful for Mobile communication and in many systems. The design of an efficient wide band small size antenna for recent wireless applications is a major challenge. In Modern wireless communication systems, multibandantenna has been playing a very important role for wirelessservice requirements[1].

Due to the advancement oftechnology microstripslot antennas are used in modernprinted circuit technology, GPS ,communication system, Wireless Local Area Network(WLAN), Bluetooth, Wi-MAX etc. Considerableeffort has been devoted to the development and improvementof the bandwidth, return loss and reduction of size.to achieve more bands yet minimize the structure of slot antennas is still a challenge forantenna designers.

II.LITERATURE SURVEY

Pingan Liu, YanlinZou, BaorongXie, Xianglong Liu, and Baohua Sun et al [2]proposed,Compact tri-band printed

antenna forWLANand WiMAX applications. It consists of a modified rectangular slot, a pair of symmetrical inverted-L strips, and a Y-shaped monopole radiator with

ameandering split-ring slot.Tuning the locations and the sizes ofthese structures, three distinct current paths can be produced atthree independent frequency bands, resp.

The antenna has impedance bandwidth of430MHz,730MHZ & 310 MHZ which can cover both the WLAN and the WiMAX .The numerical analysis and geometry refinement of theproposed structure are performed by using ANSYS HFSS 13.0simulation software[2].

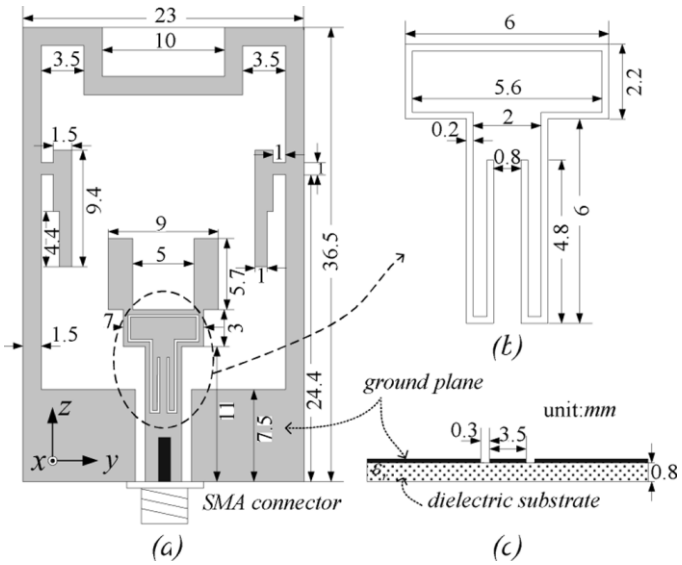

**Fig1:Geometry of proposed antenna. (a) Front view.
(b) Geometry of splitringslot. (c) Profile view [2]**

The simulated and measurereturn loss against frequency, with and without split-ring slot, are shown in Fig 2, which reveals that the split-ring slotcould improve the band-notched performance at 3-GHz band.

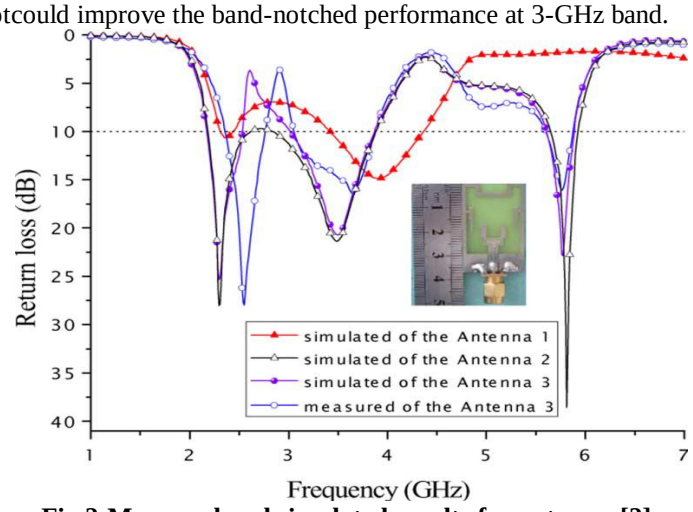

Fig 2:Measured and simulated results for antennas[2].

Mehdi Rahanandeh, Amir Saman Noor Amin, MatinHosseinzadeh, PejmanRezai, andMohammad SadeghRostami et al [3] proposed Compact Elliptical Slot Antenna for CoveringBluetooth/WiMAX/WLAN/ITU. a UWB printed monopole antenna that coversthe bandwidth of 3.1–10.6 GHz is introduced.The structure ofantenna, consists of an ellipticalslot with "T"- and "L"-shaped slots around it. This structureis fed by a 50- microstrip line with fork-shaped stubson the opposite side of the substrate. Then, by adding threequarter-wavelength stubs, a multiband antenna has been implemented.This structure covers all the standards of Bluetooth,WiMAX, WLAN, and ITU bands.
This antenna has an omnidirectional radiation pattern and almoststable gain in the frequency bands.
The simulations are done by using High Frequency StructureSimulator (HFSS) and Computer Simulation Technology (CST) software[3].

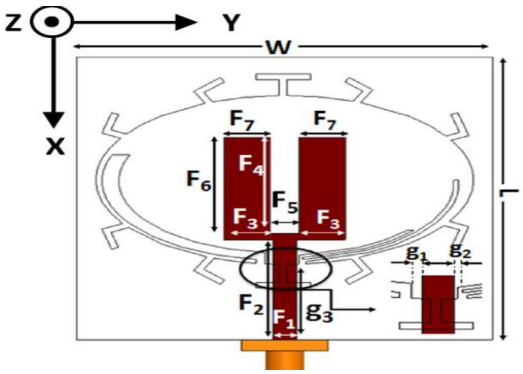

Fig 3: Structure of proposed printed multibandantenna. Front view[3].

Themeasured and simulated reflection coefficients of the proposedmultiband antenna are shown in Fig.4

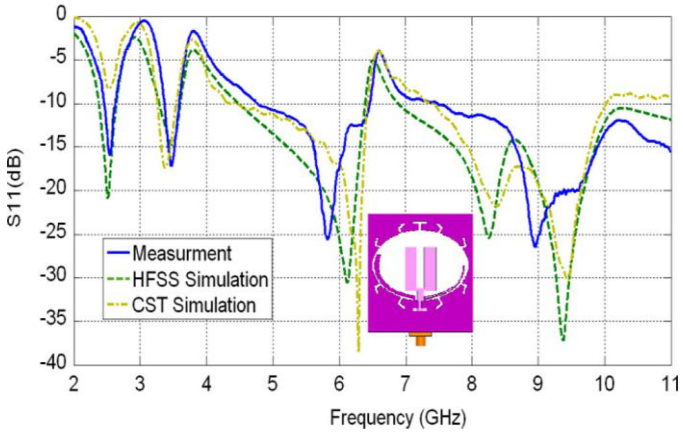

Fig.4:Simulation and measurement reflection coefficient of the printed multibandslotantenna[3].

Yazi Cao, Bo Yuan, and Gaofeng Wang et al[4]proposed Compact Multiband Open-Ended Slot Antenna for Mobile Handsets.a novel compact multiband antenna formed by two printed open-ended slots, with the first one a T-shaped slot and the second one an E-shaped slot, cut at theedge of the ground plane of the mobile handsets. To realize multiband characteristics and reduce the size of the proposed antenna, these monopole slots are series-fed by a 50- straight microstrip feed line printed on the top side of the ground plane. The antenna can generate five resonant modes to cover GSM900 (890 960 MHz), DCS1800 (1710 1880 MHz), PCS1900 (1850 1990 MHz), UMTS (1920 2170 MHz), 2.4-GHz-based WLAN band (2.4 2.48 GHz). These five resonant modes can be controlled independently by the five respective open-ended slots of different lengths.
The antennas simulated results obtained using the Ansoft simulation software HFSS[4].

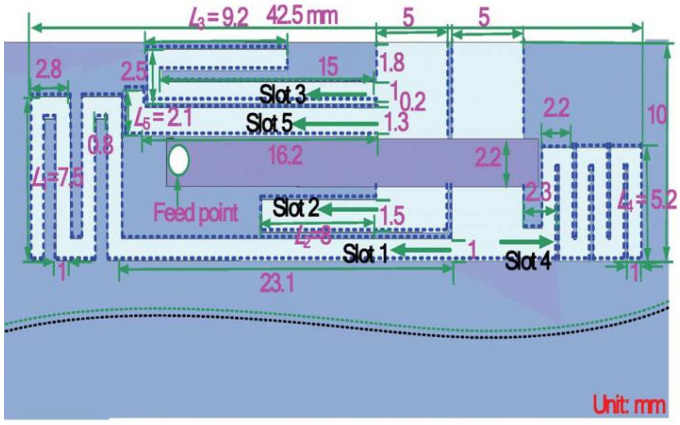

Fig.5 :Configuration of the proposed printed slot antenna[4]

The measured and simulated return losses of the proposed slot antenna are shown in Fig 6.

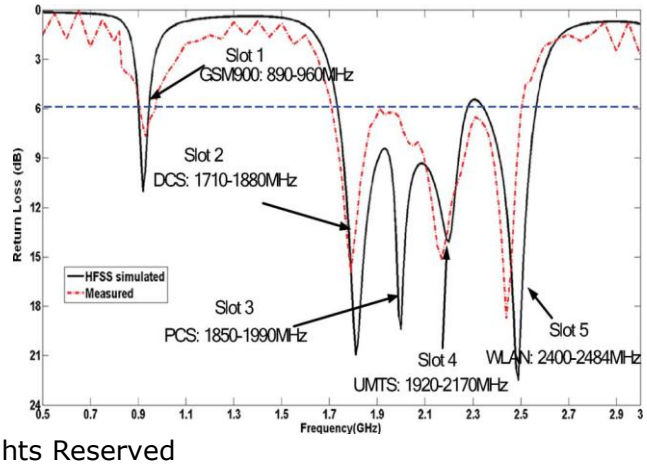

Fig. 6:Measured and simulated return loss for the proposed antenna[4].

Lin Dang, Zhen Ya Lei, Yong Jun Xie, Gao Li Ning, and Jun Fan et al [5]proposed CompactMicrostrip Slot Triple-Band Antenna forWLAN/WiMAX Applications.This antenna has a simpler structure than other antennas designedfor realizing triple-band characteristics. It is just composed of amicrostrip feed line, a substrate, and a ground plane on whichsome simple slots are etched.
The rectangular andtrapezoid slots are able to achieve dual frequencies and also providea broadband operation at high frequency. The additionalresonant mode is excited with the use of a pair of symmetricalhorizontal strips embedded in the rectangular slot.The antennas simulated results obtained using the Ansoft simulation software HFSS[5].

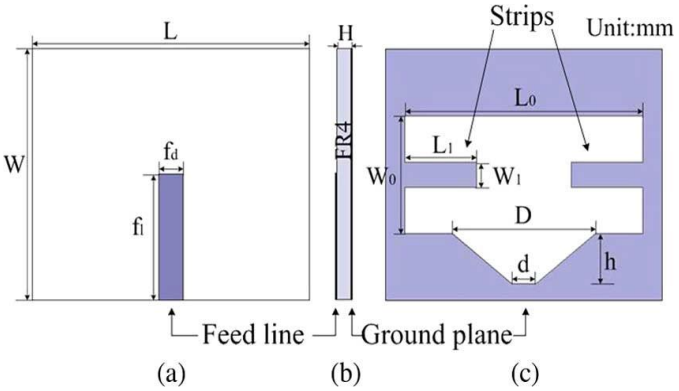

Fig. 7. Configuration of the proposed antenna. (a) Top. (b) Side. (c) Bottom.

The measured and simulated return losses of the proposed slot antenna are shown in Fig 8.

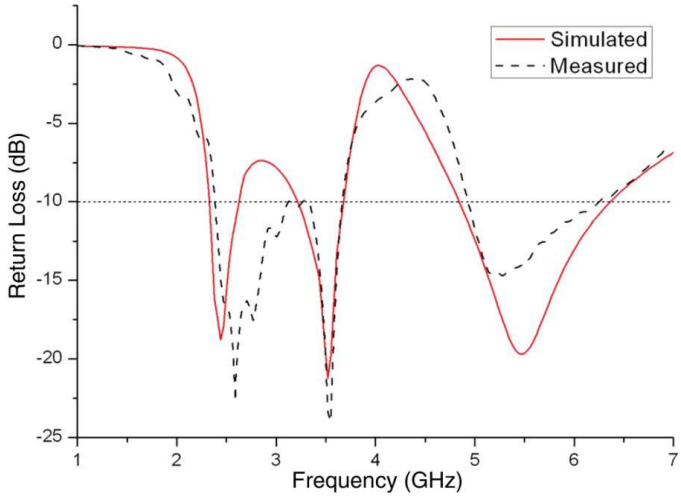

Fig 8:Simulated and measured return loss of the antenna[5]

III TABLE FOR THE COMPARATIVE ANALYSIS OF DIFFERENT TECHNIQUES

No.	Paper Name	IEEE Paper year	Remark
1.	Compact CPW-fed tri-band printed antennawith meandering split-ring slot for WLANWiMAX Applications	2012	Impedance BW of430MHz, 730MHZ & 310 MHZ cover both the WLAN and the WiMAX .

2.	A Compact Elliptical Slot Antenna for Covering Bluetooth / WiMAX / WLAN / ITU application	2012	multiband antenna covers Bluetooth,WiMAX,WLAN, and ITU freq. bands.
3.	A compact multiband open-ended slot antenna for mobile handsets,	2011	5resonant modes cover GSM900 DCS1800/ PCS1900/ UMTS&2.4GHz WLAN bands.
4.	A compactmicrostrip slot triple-band antenna for WLAN/WiMAX applications	2010	Impedance BW are 22.2%, 12.3% & about 23.2% for WLAN and WiMAX application.

IV. CONCLUSION

This paper shows the review and survey of techniques and design for the designing of efficient compact microstrip slot antenna for multiband application. Compared to antennas explained in [2-4] the antenna in [5] has simple structure and suitable forall frequency bands of WLAN andWi-MAX applications.This review work is done on some characteristics implemented through differenttechniques. But useful solution are still less and suffer from different problems like complexity of structure,reduced bandwidth, reduction of gain etc. Hence, the author feels that further research and more work is needed inthis areas.Compared to regularantennas, the slot antenna fed by microstrip line has bettercharacteristics, including wider bandwidth, less conductor loss,and better isolation between the radiating element and feedingnetwork.

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