

# NEW AVENUES IN WIRELESS COMMUNICATION TECHNOLOGY: A RESEARCH PERSPECTIVE

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**Abstract** - In this paper, new wireless technologies are surveyed. Wireless communication involves the transmission of information over a distance without help of wires, cables or any other forms of electrical conductors. The transmitted distance can be anywhere between a few meters and thousands of kilometers (for example, radio communication). Communication has enhanced to convey the information quickly to the consumers Working professionals can work and access Internet anywhere and anytime without carrying cables or wires wherever they go. This also helps to complete the work anywhere on time and improves the productivity. This technologies are Zigbee,Bluetooth,wimax,Femtocell.

**Key Words:** ZIGBEE, BLUETOOTH, FEMTOCELL, WIMAX.

## INTRODUCTION

In this thesis work, number of new technologies is compared on the basis of their performance, ability and various important parameters. Zigbee is an open global standard and designed to be used in machine to machine networks. Zigbee offers 128-bit AES encryption. The technologies ability to connect multiple devices together simultaneously makes it ideal connected home environment where user may want things like smart locks, robots, lights to talk to one another. Zigbee alliance recently standardized the technology in hope to make that connectivity possible. The technology is inexpensive to run and making ideal solution for many industrial applications. It allows the products to maximize battery life.



Figure1: ZIGBEE

## Features

- ZigBee devices are designed for low-power consumption.
- ZigBee is used in Commercial Applications like sensing and monitoring applications.
- ZigBee uses very low power and extremely long device battery life.
- ZigBee gives flexibility to do more with the reliable wireless performance and battery operation.

WiMax stands for worldwide interoperability for microwave access. This wireless technology allows data to be transferred at rate of 30-40 megabits per seconds. The WiMAX forum certifies devices before they can be sold to consumer businesses. The technology can be used both indoors and outdoors; however, WiMax devices typically produce a better

signal when used outside or by a window.



Figure2: Wimax

Bluetooth operates based on the features of adaptive frequency hopping (AFH) and forward error correction (FEC). It provides a short range wireless capability. It operates in 2.4gahertz frequency band and devices within 10meter of each other can share the data up to 720kilobits per seconds. This technology is an authenticated one by sending acknowledgment from receiver to transmitter before making connection between devices. Its limitation is that only up to 8 devices can communicate in a single network and it asks the confirmation about receiving each data at every time and also it limits the packet size.



## Features

- Bluetooth technology uses radio waves to communicate between devices. Most of these radio waves have a range of 15-50 feet.
- According to the official Bluetooth website, Bluetooth uses a low-power signal with a maximum range of 50 feet with sufficient speed to enable transmission of data.
- The pairing process identifies and connects any two devices to each other. It also prevents interference from other non-paired Bluetooth devices in the area.
- It uses maximum power only when it is required, thus preserving battery life.

Femtocell is a small range low power cellular base station. It can be deploy inside home and small office. The device communicates with mobile phone and covert voice call into voice over IP (VOIP) Packets. The packets transmit to service provider through broadband connection such as DSL, cable and optical fiber. Femtocell operates in licensed spectrum and requires regulations approval. Femtocell installation cost is very low and easily install according to cellular site. Femtocell is consider as a digital India has to connect with digital communication network anywhere, anytime, anyone.

## Features

1. Femtocell provides high QoS, it connects to core network through IP network, as well as provide high quality of VoIP (voice over IP) and data service.
2. User in femtocell has connection with user in macrocell, in other words, the user device standard for macrocell is same to femtocell.
3. Easily install, femtocell is able to play and play, once it was activated by operator.
4. Reduce the traffic load of macrocell or other femtocell, increase network capacities.
5. Low costs.

**Table -1:**

BLUETOOTH V/S WIMAX			
	Bluetooth	Wimax	Wifi
Standard	802.15	802.16	802.11a
Frequency	2.45	2.66	5
Speed	0.72	80	54
Range	10m	50km	50km
Advantages	Low Cost	Speed,Range	Speed
Disadvantages	Range	Cost	Cost

**Table -2:**  
FEMTOCELL V/S WIFI:

Specifications	Femtocell	WiFi
spectrum type	Licensed	Unlicensed
Frequency range	1.9 GHz to 2.6 GHz	2.4 GHz to 5 GHz
Transmit Power	10 mW to 100 mW	100 mW to 200 mW
coverage range	20 meter to 30 meter	100 meter to 200 meter
Backhaul connectivity	IP network	IP network
data rates supported	7.2 Mbps to 14.4 Mbps	11 Mbps to 54 Mbps

no. of active handsets	1 to 4	scalable
Disadvantages	RF interference with macrocell, Cost of Access point is high	Dual mode handset is needed

**CONCLUSIONS**

This thesis concluded that ZIGBEE wireless technology is best among all other wireless technologies. ZIGBEE is defined under IEEE 802.15.4 standard. ZIGBEE based networks consume bandwidths of 0.3MHz, 0.6 MHz and 2 MHz depending upon the frequency at which networks are communicating than other technology such as Bluetooth. The IEEE standard for WIMAX is 802.16 and fall under category of wireless metropolitan area network. WIMAX has range of about 50km with speed up to 80Mbps which far better than Bluetooth. WIMAX also provide high broadband access to user. Bluetooth due to its low cost, manufacturers are willing to implement this technology in most devices. It also consume less power and suited for very small battery powered devices and portable devices. FEMTOCELL has high speed as well as low cost but accessing area is low as compared to other wireless technologies.

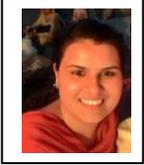
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