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Design of wireless communication System with Bluetooth technology

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Abstract: ***This document describe about the Bluetooth security as well as additional security mechanisms for selected Bluetooth wireless Profiles. Using Bluetooth it was possible to control a Mobile Device's Camera and Air time controls like Calling, SMS, and Internet Surfing etc.***

Keywords: *Frequency, Power, Bandwidth*

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HISTORY:

- 10th Century Danish King (unified warring Viking Tribes): discover Bluetooth.
- No Wireless Networks before 20th Century.

BLUETOOTH WIRELESS TECHNOLOGY:

The Bluetooth wireless technology provides short range, wireless connectivity between common devices. Different applications can be built based on these spontaneous networks. The security requirements for Bluetooth applications will vary based on the sensitivity of the information, the market, and depend upon the needs of the user.

Bluetooth wireless technology is an open specification for a low-cost, low-power, short-range radio technology for wireless communication of voice and data anywhere in the world." Bluetooth employs frequency hopping spread spectrum. Bluetooth reduce interference with other devices.

BLUETOOTH COMMUNICATION

- Radio Frequency Communications (RF C) It controls frequency hoping for Bluetooth.
- Logical Link Control (LLC)

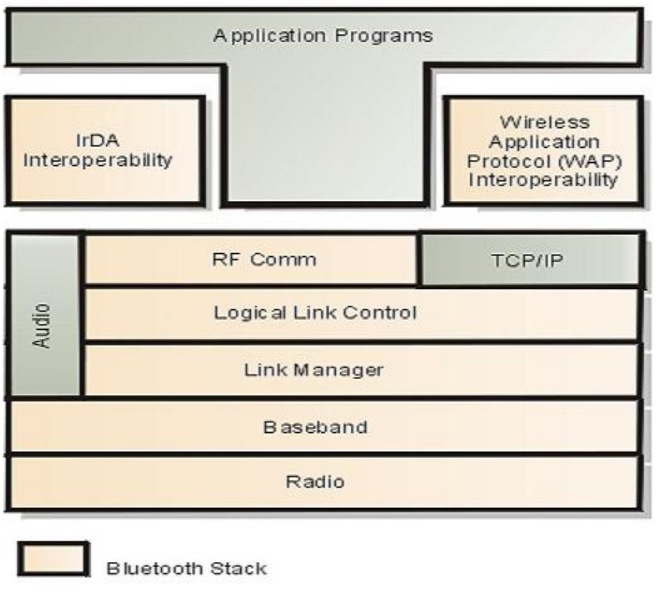
Provides Link Management

Having Security Management

QoS Management

Depend uponTransmission Scheduling

- Link Manager Protocol (LMP)
  - It can Configure, authenticate and handle the connections accurately.
  - It provides Power management scheme



ULTIMATE HEADSET

BLUETOOTH DESIGN AND DEVELOPMENT TOOLS

- Design tools: Bluetooth based upon RF and digital design tools, simulators.
- Development tools: Bluetooth including modules, chipsets, digital kits, protocol implementations and other tools
- Testing/evaluation tools.

BLUETOOTH GOALS & VISION

- Bluetooth conceived as a cable replacement technology
- Provides Short-Range Wireless Solutions
- Bluetooth provides Open Specification
- Bluetooth having Voice and Data Capability
- Bluetooth having Worldwide Usability
- Other usage models began to develop:
  - Personal Area Network (PAN)
  - Ad-hoc networks
  - Data/voice access points
  - Wireless telematics

RADIO SPECIFICATION

PDU format:

- The Bluetooth system is operating in the 2.4 GHz band. The range of this frequency band is 2.400 – 2.4835 GHz.
- The Bluetooth radio accomplishes spectrum spreading by in 79 hops displaced by 1 MHz.
- Radio modulation technique uses GFSK.

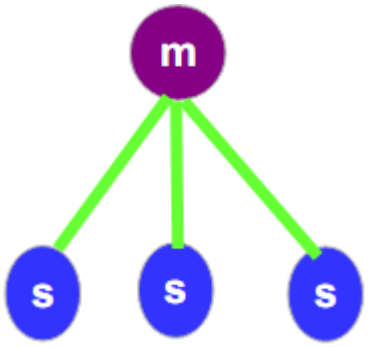
TECHNICAL FEATURES

Connection Type	Spread Spectrum (Frequency Hopping) & Time Division Duplex (1600 hops/sec)
Spectrum	2.4 GHz ISM Open Band (79 MHz of spectrum = 79 channels)
Modulation	Gaussian Frequency Shift Keying
Transmission Power	1 mw – 100 mw
Data Rate	1 Mbps
Range	30 ft
Supported Stations	8 devices
Data Security –Authentication Key	128 bit key
Data Security –Encryption Key	8-128 bits (configurable)
Module size	9 x 9 mm

TYPICAL BLUETOOTH SCENARIO

- Bluetooth will support wireless point-to-point and point-to-multipoint (broadcast) between devices in a piconet.
- Point to Point Link

  - Master - slave relationship
  - Bluetooth devices can function as masters or slaves
- Piconet
  - It is the network formed by a Master and one or more slaves (max 7).



— Each piconet is defined by a different hopping channel to which users synchronize easily.

— Each piconet has max capacity (1 Mbps).The transfer rate is about 1 mega bit per second.

ADVANTAGES

1. In Bluetooth we can share text, images etc
2. We can send data at a rate of 1mbps.
3. Bluetooth can either act as a master or slave.

DISADVANTAGE:

1. Bluetooth is limited in the range of 30 ft.

2. Bluetooth can operate 7 devices at a time.

CONCLUSION:

Bluetooth has played the vital role to transmit the data .bluetooth has many advantages in comparison to other technologies (like infrared). In bluetooth we can send the data with in the range of 30 ft.(i.e: we don't need to attach the two devices) but in the case of infrared we also send the data till the devices are placed closer to each other.in the case of Bluetooth we can safely and easily send the data from one place to another.