



## Review Paper on Comparative Study of IEEE Protocols Suite

**Jasleen Kaur**M.Tech CSE Department  
Kurushetra University**Shakti Nagpal**HOD, CSE Department  
Geeta Engineering College

*Abstract-The purpose of this paper is to study types of IEEE protocol suite 802.11 and 802.3. and their various standards. An IEEE protocol creates the parameters and guidelines for a particular service or technology. For example, the IEEE protocol for wireless technology used in a wireless local area network is known as the IEEE 802.11 standard. IEEE 802 is a family of standards for LAN.*

*Keywords: IEEE802.11, IEEE 802.15, IEEE 802.15.4, IEEE 802.15.6, IEEE 802.3*

### I. INTRODUCTION

#### A. Types Of IEEE Protocol Standards

##### 1. IEEE 802.11- WLAN/Wi-Fi

IEEE 802.11 provides high bandwidth connectivity in a local area network (LAN) environment that is suitable for most data applications. Wireless LAN (WLAN, also known as Wi-Fi) is a set of low tier, terrestrial, network technologies for data communication [2]. It is called 802.11 after the name of the group formed to oversee its development. Unfortunately, 802.11 only support a maximum network bandwidth of 2 Mbps - too slow for most applications. For this reason, ordinary 802.11 wireless products are no longer manufactured. The 802.11 standard is further divided into various sub-categories. Each of these subsets, such as 802.11a, 802.11b, and 802.11g, 802.11n represents a different IEEE protocol. Table 1 shows the comparison between different IEEE standards.

**TABLE: 1**  
**COMPARISON BETWEEN DIFFERENT IEEE STANDARDS.**

Attribute	802.11a	802.11b	802.11g	802.11n
Frequency	5 GHz	2.4 GHz	2.4 GHz	5GHz and/or 2.4GHz
Typical Data Rate	23 Mbit/s	4.5 Mbit/s	19 Mbit/s	74 Mbit/s
Max Data rate	54 Mbit/s	11 Mbit/s	54 Mbit/s	300 Mbit/s (2streams)
Range	115 feet	115 feet	125 feet	230 feet
Pros	fast maximum speed; regulated frequencies prevent signal interference from other devices	lowest cost; signal range is good and not easily obstructed	fast maximum speed; signal range is good and not easily obstructed	fastest maximum speed and best signal range; more resistant to signal interference from outside sources
Cons	highest cost; shorter range	slowest maximum	costs more than 802.11b;	standard is not yet finalized; costs more

	signal that is more easily obstructed	speed; home appliances may interfere on the unregulated frequency band	appliances may interfere on the unregulated signal frequency	than 802.11g; the use of multiple signals may greatly interfere with nearby 802.11b/g based networks
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**2. IEEE 802.15.1 – Bluetooth**

The IEEE 802.15.1 standard [3] is the basis for the Bluetooth wireless communication technology. Bluetooth is a low tier, adhoc, terrestrial, wireless standard for short range communication. It is designed for small and low cost devices with low power consumption. The technology operates with three different classes of devices: Class 1, class 2 and class 3 where the range is about 100 meters, 10 meters and 1 meter respectively.

**3. IEEE 802.15.4 – ZigBee**

ZigBee is a low tier, ad hoc, terrestrial, wireless standard in some ways similar to Bluetooth. The IEEE 802.15.4 standard [4] is commonly known as ZigBee, but ZigBee has some features in addition to those of 802.15.1. It operates in the 868 MHz, 915 MHz and 2.4 GHz ISM bands.

**4. IEEE 802.15.6**

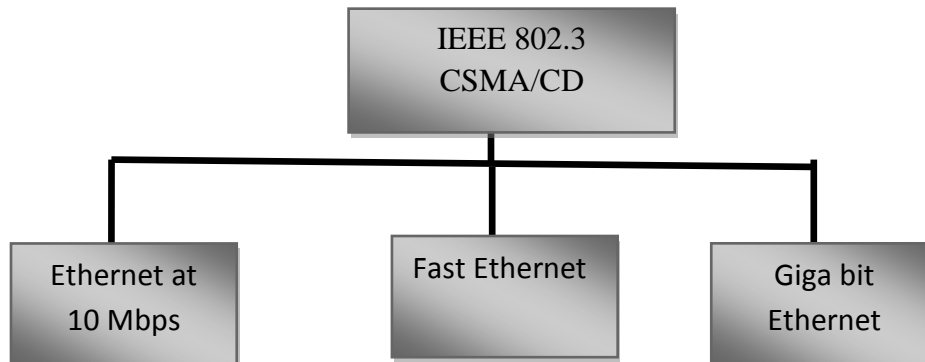
IEEE 802.15.6 is a bit elusive, but some of the available information points to some kind of wireless Body Area Network (BAN). 802.15.6 covers the terahertz range and it will use T-rays which has properties of both light and radio. Table contains an overview of which standards support which modes.

**TABLE II  
AN OVERVIEW OF WHICH STANDARDS SUPPORT WHICH MODES.**

Standard	Adhoc	Infrastructure
802.11a/b/g/n	Yes	Yes
802.15.1	Yes	No
802.15.4	Yes	No
802.15.6	Unknown	Unknown

**5. IEEE 802.3**

IEEE 802.3 is a standard specification for Ethernet, a method of physical communication in a local area network (LAN), which is maintained by the Institute of Electrical and Electronics Engineers (IEEE). In general, 802.3 specify the physical media and the working characteristics of Ethernet. The original Ethernet supports a data rate of 10 megabits per second (Mbps). It is the standard for CSMA/CD (Carrier Sense Multiple Access with Collision Detection). This standard encompasses both the MAC and Physical Layer standards. The IEEE 802.3 standard defines two LAN operations. The first is the half-duplex mode, which in principle is similar to a walkie-talkie phone--it can receive and send data one at a time. The second mode of operation (and most popular) is the full-duplex mode, which can send and receive data simultaneously.



**FIGURE: 1 DESCRIBES THE FAMILY OF THE IEEE 802.3 STANDARD [4].**

Fast Ethernet operates at 100Mbps, or called 100BaseT. Even more, there is a Gigabit Ethernet technology, which operates at 10Gbps.

**II. COMPARISON BETWEEN IEEE 802.3 and IEEE802.11 [6]**

<b>IEEE802.3</b>	<b>IEEE802.11</b>
Transmission Medium used in IEEE 802.11 is coaxial cable ,twisted pair, optical fiber	Transmission medium used in IEEE 802.11 is infrared ,radio microwaves
Bus and Star Topologies Used in IEEE 802.3	Ring, Nomadic, Adhoc Network technology is used
Manchester Encoding technique [5] is used	Gaussian Frequency Shift Key is used for encoding
Protocol uses the CSMA/CD method to arrange the users in network to gain the access to the medium in order to send the packet transmission	Make use of CSMA/CA to provide access to the transmission medium

**III. CONCLUSION**

This paper analyzes the comparative study of IEEE protocols suite and tries to explain the comparison between IEEE802.11 and IEEE802.3.

**REFERENCES**

- [1] Institute of Electrical and Electronics Engineers. IEEE Std. 802.11-2007, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, 12 June 2007.
- [2] Institute of Electrical and Electronics Engineers. IEEE Std. 802.15.1-2005, Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Wireless Personal Area Networks (WPANs), 14 June 2005.
- [3] Institute of Electrical and Electronics Engineers. IEEE Std. 802.15.4-2006, Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs), 8 September 2006.
- [4] Halsall, F. (1996), Data Communications, Computer Networks and Open Systems, Fourth Edition, Addison-Wesley, Essex, United Kingdom.
- [5] Stallings, W. (2000), Local & Metropolitan Area Network, Sixth Edition, Prentice-Hall International, New Jersey.
- [6] Comparison study of IEEE802.3 & IEEE802.11 Protocol Mohamad S Syauqi, Dodi Rachmat, Sasongko A Cahyono and Ergin Cardakli School of Electrical and Computer Engineering, RMIT University.