International Journal of Engineering Sciences Paradigms and Researches (IJESPR) (Vol. 42, Issue 01) and (Publishing Month: May 2017) An Indexed and Referred Journal with Impact Factor: 2.80 ISSN (Online): 2319-6564 www.ijesonline.com

Wi-Fi IEEE 802.11ac Vs IEEE 802.11ad: A Comparative Study

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Publishing Date: May 27, 2017

Abstract

Lately the wireless interconnection has turned into a preferred technology, because of its ease used and because of its mobility; therefore an instant development has surfaced in the cellular technology. An instant development has surfaced in the cellular. Technology therefore Wi-Fi is the most frequent technology used today. This paper is a comparative study, it illustrates the essential characteristics of two of the very most recent currently used wireless LAN systems 802.11 ac and 802.11ad, this evaluation helps users distinguish between both of these types for selection.

Keywords: *IEEE* 802.11, 802.11ac/ad.

1. Introduction

IEEE 802.11 is a couple of media gain access to control (Macintosh personal computer) and physical coating (PHY) requirements for implementing cellular geographic area network (WLAN) computer communication in the two 2.4, 3.6, 5, and 60 GHz rate of recurrence bands They are manufactured and managed| by the IEEE LAN/MAN Specifications Committee (IEEE 802). The essential version of the typical premiered in 1997, and has already established subsequent amendments. The typical and amendments supply the basis for cellular network products using the Wi-fi brand. Whilst every amendment is officially revoked when it's designed in the latest version of this.

2. IEEE 802.11ac

Is a radio networking standard in the 802.11 family (which is advertised under the brand Wi-Fi), developed in the IEEE Specifications Connection process providing high-throughput cordless local area systems (WLANs) on the 5 GHz music group The standard originated from 2011 through 2013 and approved in January 2014 this specification has expected multistation WLAN throughput of at least 1 gigabit per second and an individual link throughput of at least 500 megabits per second (500 Mbit/s). That is accomplished by increasing the air interface concepts embraced by 802.11n: wider RF bandwidth (up to 160 MHz), more MIMO spatial channels (up to eight), downlink multiuser MIMO (up to four clients), and high-density modulation (up to 256-QAM).

2.1 Features

80 MHz route bandwidths, five to eight spatial channels, 160 MHz route bandwidths, 80+80 MHz route bonding and MCS 8/9 (256-QAM).

3. IEEE 802.11ad

IEEE 802.11ad can be an amendment that identifies a fresh physical coating for 802.11 sites to use in the 60 GHz millimeter influx spectrum. This rate of consistency band has different propagation characteristics than the two

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significantly, 4GHz and 5GHz bands where Wi-Fi networks operate. Products applying the 802.11ad standard are being taken to market under the WiGig brand. The documentation program is currently being produced by the Wi-Fi Alliance rather than the now invalid WiGig Alliance. The peak transmitting rate of 802.11ad is 7 Gbit/s.

3.1 Specification

The WiGig Macintosh personal computer and PHY Standards The WiGig PHY and Mac pc Standards version 1.1 includes the next capacities [6]:Supports data transmitting rates up to 7 Gbit/s - more than ten times faster than the best 802.11n rate. Supplements and expands the 802.11 Multimedia Gain access to Control (Mac pc) coating. WiGig devices physical coating allows low vitality and powerful, guaranteeing communication and interoperability at gigabit rates. Protocol adaptation layers are being developed to aid specific system interfaces Works with beam forming, permitting powerful communication at ranges}beyond 10 meters. The beams can move within the coverage area through adjustment} of the transmitting phase of specific antenna elements, to create stage array antenna beam forming.

WiGig devices extensively use advanced security and vitality management. The 802 however.11ad MAC layer has been updated to handle areas of channel access, synchronization, association, and authentication necessary for the 60 GHz operation.

4. Difference between 802.11ac and 802. 11ad

4.1 Frequency

802.11ac and 802.11ad increases after the cellular features released in 802.11n. 802.11ad using variety in the unlicensed 60GHz strap. where a lot more overall bandwidth comes in either the two 2.4 or 5GHz rings presently implemented in 80. The Cellular Gigabit Alliance (WiGig) initiated the standards development to consider good thing about this variety, but their work has been rolled in to the IEEE 802.11ad draft standards.

4.2 Compatibility

Chipsets presenting 802.11ac are completely backwards suitable with earlier Wi-Fi specifications completely. This means it works with 802 perfectly.11a, 802.11b, 802.11g and 802.11n. 802.11ad is not backward appropriate to 11ac and 11n but it is a totally new standard developed to provide extremely high data rate also to provide brief range wireless connection.

4.3 Range

802.11 ac runs to about 80 m with 3 antennas while 802.11 advertisement permit more than about 10 meters with beam forming.

4.4 Data Rate

802.11ac uses 1.3Gbps while 802.11 advertisement uses 7Gbps, i.e. 802.11ad is faster 7x than 802.11ac of the specified style "caption" from the drop-down menu of style categories.

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5. Results and Discussions

Table 1: IEEE802.11ac vs. IEEE802.11ad

D	000 11	000 11 1	<u> </u>
Parameters	802.11 ac	802.11 ad	Comment
Frequency	5 Ghz	60 Ghz	The frequency of
Comparison	5 GIL		802.11ad is more than 802.11ac
Compatibility	It supports	It is not	But it is completely
	legacy 11n	backward	new standard
	systems	compatible	developed to Cater
		to 11ac and	extremely high
		lln	data rate and to
			wireless
			connectivity
Data Rate	1.3Gpbs	7Gpbs	802.11ad is very
	-	-	high speed
			throughput than
			802.11ac
Distance	About 80M	About 10	802.11ad very high
	with 3	meters	throughput at short
Modulation	BPSK	64-0AM	60 GHZ Carrier
Woddiation	OPSK	04-QAM	provides 10 Times
	160AM,		more cycles to
	64QAM,		modulate than a
	256QAM		6Ghz Carrier
Data	Supports	Supports	802.11ad is more
Subcarriers	468 data	336 data	data subcarriers
	subcarriers	subcarrier	
	per OFDM	connection	
	symbol		

The table contains some comparison which is discussed in terms of frequency, compatibility, data rate, distance, modulation and features. One of the considerable benefits of 802.11ad is its high data rate and support of 468 data subcarriers per OFDM symbol.



Figure 1: WLAN Classification

6. Conclusions

The IEEE 802.11ac and 802.11ad features both promise to provide increased capacity, velocity and performance in several ways, allowing users go to take pleasure from even their highest datarate applications.

The significant difference is the fact that 802.11ad will operate in the 60 GHz strap there are few applications in the 60 GHz band mostly because the signal loss is so high relative to 2 primarily.4 GHz and 5 GHz. Higher reduction results in a much shorter transmitting range. Because of this 802.11ad will not be suitable of assisting transmissions between gain access to items and devices dozens of meters aside of meters Rather, 802.11ad will be used for inroom cellular cable. 802.11ac comes after the development of 802.11b to 802.11g to 802.11n; 802.11ad isn't on that same route 802.11ad stands exclusively as a potential HDMI cable connection alternative or for other short-range, low-user density applications. Where 802.11ac is "faster WiFi effectively, 802.11ad is wi-fi HDMI" effectively. 802.11ac provides higher capacity to a sizable coverage cell while 802.11ad provides dramatic throughput to some users in a tiny area. 802.11ac is a radio LAN while 802.11ad is a radio PAN.

The WiGig/11ad standard also specifies an adaptive beam forming option that delivers high

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antenna benefits and slim directionality to reduce interference and the capability to change to the encompassing to enhance data rate and hyperlink reliability.

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