## Introduction

The implementation of wireless devices is constantly increasing. The number of devices with internet connectivity currently exceeds the possible number of IPv4 addresses. Many of these devices use wireless local area networks (WLANs) for internet connectivity. Wi-Fi has been a successful and heavily implemented computer communications technology. The 802.11 has been a standard in the industry with 802.11 ac offering the most advanced capabilities. This technical review summarizes the technological advances, commercial implementation.

# Advances

# A. IEEE 802.11n

The 802.11n offers many improvements compared to older versions. It implements new physical and MAC features to provide faster and more reliable connectivity. It provides an approximate transmission rate of 130 Mbps. It also has increased bandwidth, from 20MHz to 40MHz. The 802.11n standard employs OFDM modulation technique. This provides 52 data sub-carriers in a 20MHz channel, an increase from the 42 sub-carriers for earlier versions[4]. 802.11n is the first IEEE standard to widely implement a new antennae configuration. This antennae configuration, known as Multiple Input, Multiple Output (MIMO), refers to the ability of 802.11n to accommodate multiple radio signals. The MIMO increases both the range and throughput of a wireless network. Connectivity range is important for wireless devices, The IEEE802.11n offers an indoor connectivity range of 75m.

#### B. IEEE 802.11ac

802.11ac is the fifth generation in Wi-Fi networking standards. This standard operating frequency is 5GHz. It has increased bandwidth from 40 MHz to 160MHz. This allows 802.11ac adapters to cover the previous 20 and 40 MHz channels while providing additional bandwidth. The maximum transmission rates of all included channels are 97Mbps for 20MHz, 200Mbps for 40MHz, 400Mbps for 80MHz, and 800Mbps for 160MHz. The 802.11ac standard uses a wider channel and an improved modulation scheme that also supports more clients. The IEEE 802.11ac uses the MIMO antenna configuration also implemented by the 802.11n.The indoor range is 35m.

### Commercial implementation.

The 802.11 standard is used for wifi communications. All of the latest internet devices, including smartphones and laptops, have WLAN chips that support this standard.

# Sources

[1] Youyun Xu, "Journal of Computer Networks and Communications," *Volume 2018*, Article ID 3518352, 10 pages"

[2] Broadcom launches first gigabit speed 802.11ac chips." 2013, <u>https://www.prnewswire.com/news-releases/broadcom-launches-first-gigabit-speed-80211ac-chips---opens-2012-ces-with-5th-generation-5g-wi-fi-breakthrough-136728148.html</u>.

[3] Jagdish Rebello, "WLAN: Differentiation Opportunities Emerge as 802.11n Rapidly Becomes Mainstream", http://www.isuppli.com/Abstract/WLAN-Differentiation-Opportunities-Emerge-as-802-11n-Rapidly-becomes Mainstream.pdf, accessed June 15<sup>th</sup>, 2019.

[4]

https://pdfs.semanticscholar.org/a969/fe34daa19d07519b8636346cc766a19113be.pd <u>f</u>

[5] http://www.iosrjournals.org/iosr-jce/papers/Vol17-issue5/Version-3/D017532629.pdf

https://www.hindawi.com/journals/jcnc/2018/3518352/

https://pdfs.semanticscholar.org/a969/fe34daa19d07519b8636346cc766a19113be.pd <u>f</u>

https://books.google.com/books?id=mWMnAAAAQBAJ&printsec=frontcover&dq=802.11a c&hl=en&sa=X&ved=0ahUKEwix5KT9v\_DiAhXxguAKHY9PD5gQ6AEIKDAA#v=onepage&q=802.11 ac&f=false

http://www.iosrjournals.org/iosr-jce/papers/Vol17-issue5/Version-3/D017532629.pdf

https://pdfs.semanticscholar.org/5399/e7a4f1f7e4023eefd725cd551a481f109a18.pd <u>f</u>