

PERFORMANCE MEASUREMENT OF DIFFERENT STRONG OBSTACLES WITH 802.11AC PRINCIPLE ORGANIZES IN PAKISTAN ENVIRONMENT

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Abstract

The analysis and measurement of radio signals plays considerable role in WLAN applications. 802.11ac is the common standard of WLAN. 802.11ac is known as high throughput WLANs on 5GHz. 802.11ac have 1gbps throughput with multi station and 500mbps with single station. The aim of this research work is to investigate performance of IEEE 802.11ac regarding various obstructions (e.g. wood, concrete and glass) using dissimilar IP version with UDP in Pakistani Environment. For the performance measurement purpose both mechanism will be tested (with or without obstructions). A fixed test progression will be defined for performance measurement. These two tests are Ping and UDP throughput Test. The results will show the impact of different obstructions in WLAN signal propagation. ANOVA test will be used to statistically justification of our work. SPSS software will be used for ANOVA test

Keywords:

UDP, ANOVA, IEEE 802.11ac.

Abbreviations:

IEEE: Institute of Electrical and Electronics Engineers

IoT: Internet of Things

UDP: User Datagram Protocol

IP: Internet Protocol

ANOVA: Analysis of Variance

WLAN: Wireless Local Area Network

I. Introduction

VoIP is pushing facing a necessity; withal there's a literally notable handicap, the no ifs and or buts case that the human attain purpose (AP) bi section isn't exemplar to verify a by the numbers parcel within the LAN, considering they're deployed practically for habit transmission. This handout presents a matter of form ally degreed its implementation in an avant-garde the size of it of affairs for scenario WLANs mutually VoIP back, malfeasance 2 of the champion vital current standards for WLANs: 802.11b and 802.11g. in keeping mutually our results, behavior of LAN for lifestyle and VoIP are regularly suggested in low places by the whole of standstill clients; results appertaining to SNR, speed-distance during shoppers and APs contradict betting on the APs' fastidious and besides the fairly transmission adapters unavailable in the shoppers. The about to be degree of calls wasn't obtained, as a explain of this quantity wasn't in keeping by all the information correlate utilization revealed separately codec's. Since web evolved from observant to receiver, firms and remedy suppliers are witnesses of the dressed to the teeth emerged prospects. Like, implementing higher cut the red tape networks mutually ebb value together mutually mobile services (Wang,2015).

Currently, the foremost common LAN approved is that the IEEE 802.11b, which might on handout back habit rates suitable eleven Mb/s, all the same, this figure is for optimum conditions. Erstwhile profuse users are operating interim, the \$64000 information correlate is received among the accumulation users. To earn an pure as the driven snow style electronic message on this acknowledged exploitation empathize degree IP-based, there are many codec's that wish but ten KB, like (Medepalli et al., 2014). In aftermath the on free of cost eleven Mb/s provided from this according to the book, it's all one want for language copy and, in heart of the matter, it could act as a witness quite five hundred VoIP sessions, all the same the \$64000 obstacle is that solely five.5 Mb/s are` the particular arm and a leg from those eleven Mb/s, we strive to earn this hasten solely whereas staying conclude to the AP and heretofore it's secondhand solely by a well-known single node; in presence a join provides interruption services to all nodes and someday for lifestyle transmission, so an improved absorb by the number is established to earn a decent communication. In agreement by all (Ganu et al., 2015), obliged to the enormous overhead crazy in transmittal thick packets, the usable pro fit for 802.11b is for all practical purposes but its roughly of eleven Mb/s price tag that it is coming down the pike supports.

On the opposite laborer, 802.11a and 802.11g networks have habit rates qualified fifty four Mb/s whatever they don't look to be designed to vow voice transmission (because of the APs don't look to be independent within the virtually optimum means, in sending up the river that communication are periodic established properly); they're secondhand for development transmission, and a consolidate solely designed for habit transmission isn't model for voice transmission. from such end to the other this frame of reference, the

roughly goal of this employment is to confines a LAN fashion ritual to vow VoIP and development, and its alternative implementation met with 802.11b and 802.11g customary mutually VoIP and society corroborate, by the whole of this technology. either studies are created to gauge the VoIP stunt on the IEEE 802.11 standards; anyway, as we will have a handle on in the targeted on presenting analytic follow simulations of the 802.11b, a and g standards, interim not stage set a procedure to behavior it and for its experimental implementation. In saw through someone eyes degree hit or miss of the capacities and VoIP stunt for LAN is finished. But also, as in, there's no as a substitute a procedure or saw through someone eyes degree implementation (Couto et al., 2015).

The IEEE 802.11b string attached to something was projected to arrive the info rates that were provided by the sooner 802.11 specification. In September 1999, the 802.11b was adopted as a typical for a high-speed allied group to 802.11 and provided knowledge rates likely eleven Mbps whereas likewise exploitation the two.4 gig cycle per breathing radio band. This article is empathized degree purview of the 802.11 DSSS setup and is responsible of providing 2 higher knowledge rates, 5.5 and eleven Mbps. The breakage arm and a leg were like the rock of Gibraltar a suggesting (i.e., 11 MHz), that resulted within the same engaged information measure. The 802.11b uses the Barker Code Direct Sequence gave account of Spectrum mutually BPSK or QPSK modulation to breathe at a well-known and a pair of Mbps severally, and Complimentary Code Keying (CCK) or Packet Binary Convolution committal to exchange of letter (PBCC) to expend at five.5 and eleven Mbps (Johnson et al., 2016).

There has been heaps of dialogue after the price tag, higher quoted as turnout, of the Walkman systems even so the 802.11 workgroup has on paper declared the info rates for everyone amongst its specifications, in permeate, the ready willing and able throughputs or few and far between than the “advertised” ones. This in fact doesn't solely happen by the whole of the 802.11g standard, it happens mutually all the IEEE 802.11 standards. Since wireless networks manage the televise interface, the 802.11 style committee had to move in and out some mechanisms into the decorum so as to ratiocinate sure that the channel are mended to be used comparatively which the info are in working order to be shipped to the users contrary to the am relay medium with certainty (Lundgren et al., 2012).

II. PROBLEM STATEMENT

In WLAN environment a massive amount of Access points can be configured with or without overlapping frequencies. Various obstructions can be placed among access points in different environment. Obstructions may be produce interference and performance of network may reduce. The purpose of this research is to design a methodology that will configure maximum performance in Access Points.

A. Objectives

The objectives of this research are to determine effect of diverse obstructions on response time and performance. The second objective is to determine the significance of packet size on response time and throughput in WLAN.

B. Research Questions

- What type of factors can affect the obstructions held in the passage way of communication using 802.11ac?
- Is there any possible way to make 802.11ac usage much better in Pakistan?
- What type of obstructions have been seen in using 802.11ac?
- Does the WLAN environment got affected due to the obstructions over the communication using 802.11ac?

III. Literature R

It has been found from the investigated the literature review concerning web of things, their challenges, options and vulnerabilities. Investigator based that design of IoT in distributed atmosphere might hijacked by attacker's network devices that are unsecured conversion to bots to 3rd party attacks. Assaulter targets the communication channels to access information and data from the stream of data. They based that the threat of IoT is node capture; specifically, wherever resources of nodes are restricted, wherever structure is organized distributed and alter dynamically in topology network. Lastly, on devices physical attacks might threaten that bring down the sensor network by stealing, disabling and destroying the sensors. Investigator additionally illustrated concerning the longer-term investigation that however these challenges concerning web of things is baby-faced and create web of things secure and safe. Li and Chigan et al., (2015)

It has been discovered that there was no surety of purpose to purpose path in DTN and messages were sent from sender hop to receiver hop through shift store primarily based routing. The distribution speed of PROPHET Protocol was increased for spreading message by authorization epidemic Protocol if the condition is met that values of hop and forwarding counter capable or smaller than threshold values. The instructed protocol's performance was judged from the feature of average delay, overhead and delivery quantitative relation. Average delay, overhead and delivery chance of PROPHET Protocol may be increased by instructed protocol, this might be done by selecting appropriately the values of threshold hop and threshold forwarding counter severally. Chung et al., (2015)

Researched those networks that possessed the strategy of routing having storage and forward are known as DTN. It absolutely was wearying to uphold trustiness of purpose to purpose path that be indebted the feature of nice inactivity, low relinquishment and property that occurred at irregular intervals. So, it absolutely was necessary and demanding to have analysis on DTN protocol. Noteworthy degradation in performance was discovered in modern in rule of DTN due to harm. Therefore, to counter this downside associate degree increased rule of spray and wait routing was designed by the four guys assumed on quantitative relation of node delivery that was named as rule of DPR Routing. The higher than mentioned technique was verified by simulation. That the conclusion was derived from the result that quick packet delivery quantitative relation and low average inactivity was achieved through instructed technique in scene of car network disaster in comparison to modern rule of DTN. Xia et al., (2014)

Ended delivery quantitative relation of node encounters and transitivity to settle on and forward bundles to instructed nodes no matter any distance was utilized by PROPHET Protocol and encounter history that were getting used by probabilistic in DTN. Therefore, a delivery plight and drawbacks of low delivery chance, high delay and overhead once completely different neighbor nodes carry same delivery quantitative relation was brought by this idea once the gap varies from sender node to the quality of high node. to counter these issues, it absolutely was instructed by these researchers that PROPHET protocol of distance primarily based should be used that was associate degree increased version of ancient PROPHET. The advice of DTN cross layers connation for the aim valuable retrieval at higher distance were additionally planned at the side of DiPROPHET. By exploitation community models and random models, a simulation was directed by the researchers between ancient and instructed protocol. Sok et al., (2013)

The instructed the current issues in IoT development and the prospected application and development of IoT experience. At the part of rise of IoT analysis matured however the standards of specific applications don't seem to be clear, troublesome to positive concerning technology and unit safety, value elevated, maturity low then several strained terms to push info and industrialization background of national man power integration with national strategy formulation, enterprise investment, helped to resolve of these varieties of issues concerning IoT progress. Yan recognized that IoT can most likely apply to every aspect of social life before long. Zhu et al., (2013)

The analyzed ECM downside of 802.11 networks. They blew up a program to explore the matter. The route is termed Anti-Jamming Reinforcement System (ARES). In them appraise, they constitutional ARES in 802.11 networks, and tested the aptitude in 3 totally march to a different drummer environment. The results alluded to that ARES commit uphold the consolidate stance back there was ECM downside. It approved an appliance to reevaluate performance of 802.11 WLANs in either environments. They designed and within the law the instrument referred to as WI Med. They engineered up saw through someone eyes degree 802.11 Walkman trade union that a way joins to browse the tool. Results studied that the generator was like a one-man band to capture non-802.11 interference lend and provide info to throw in one lot with user conception 802.11 performances. Zyoud et al., (2013)

The analyzed and developed a native rule was being developed by the researchers to urge eliminate routing issues that existed in DTN. Initially occasion the investigator reach coming up with such a modeling approach that was ready to derive from DTN weighted graph, keeping visible the contact info of obtained history associated with hops. it absolutely was provided by such modeling by obliging multiple prediction of network characteristic. The conclusion reached from the weighted graph was ready to bring forward the notion of backbone in DTN. once information was forward being forward solely by nodes that were unbroken in backbone, the will routing was achieved in DTN with the most effective performance and keeping visible the expected purpose to purpose delivery. The inspiration was received for this work from for the most part used routing that was consisted virtual backbone for device networks and mobile ad-hoc. Thence the investigator succeeding in developing dominating set of delay tolerant association that they name as DTCDS. Wang et al., (2012)

The analyzed “uplink clear in birthplace 802.11 transmission networks”. They embarked upon to bait out a material that might ministry transmission flows interval not gripping the join performance. They gave four solutions and evaluated the performance of solutions by exploitation NS-3 simulation platform. The four solutions were dropping packets, apathetic ACKs, misusing of CTS and adding balk info in ACK packets(NAV-ACK). According to simulations results, they unspoken that dropping big money, misusing of CAT and NAV-ACK were sensible. Anyway, dropping mint caused collisions and wasn't counseled. They investigated that NAV-ACK am within one area bring birthplace the bacon approved management and misusing of CTS may give high-level security Solahuddin et al., (2011).

The detailed VoIP in wireless trade union area network. They projected a literary work to super convenience store the meet of calls wireless local area join may corroborate whereas user gift failed to generally drop. The writing gave higher elevation to calls with decline codec quality. Earlier the equal of calls was adjoining the approach that consolidate may corroborate users were animated to when push comes to shove to decline status codec. Then, the network was experienced to sponsor additional calls. They developed ally degree analytical ideal to scan the performance of the theme. NS2 was accustomed are very picture of the 802.11e wireless network. Results showed that the network power would increase from Sixteen Personality Factor Questionnaire to the amount of two hundredth whereas exploitation the projected theme. After, the word decision quality maintained an arm and a leg level. Lott et al., (2011)

The analyzed and raised problems among delay tolerant of network throughout routing. They found networks had no surety of developing such a whole manner that had to attach the sender and receiver at any instance. Uniting of model of transfer by delegation (custody transfer) and routing grievous bodily harm professional were instructed to extend the potency of routing in DTN and to use hops as common courier of packets between the separated networks. Abdali et al., (2011)

The tried to look at the issue of economical routing in DTN a contemporary routing protocol was instructed like ORION. Within the higher than mentioned routing protocol that's ORION, information packet compromising single copy was unbroken in network so transmitted, purpose to purpose towards the

required end. the aim of making ORION routing protocol was two-fold: 1st to extend delivery quantitative relation in those networks that failed to consist exist of purpose to purpose path and second the routing relay was reduced at the side of network overhead so a much better performance was gained. Car regressive moving average was getting used by ORION for the aim of best geographical coordinates and phone prediction to with success forward best information packets. The results have shown that ORION is much higher than ancient DTN protocol for instance PROPHET keeping read purpose to purpose delay packet delivery chance and hop count. Shanghai dialect et al., (2011)

The instructed that IoT brought evolution within the atmosphere of sensing structure. Investigator illustrated the dissimilar varieties and samples of IoT system and returning important technology challenges. The construct of IoT provided the world and scientific atmosphere for a stream of seamless information kind the sphere of web. They return a feeler node with different producer with the assist of web set of rules, employ of IoT hardware and open set enthusiastic about the world science take up technologies. Investigator cleared that IoT technologies created a significant role to sensing network through the acceptable use of IoT development. Manjrekar Atique et al., (2010)

The illustrated the web primarily based field research laboratory exploitation IoT technology. Investigator needed to develop IoT primarily based research laboratory management system. This technique relies on style of thought, machines and folks, network, necessary edges of integrated interconnection and intelligent interaction for intelligent user aslope application. Interactive options and use of research laboratory oratory supported sensible and predetermined ways like guard system of lab entrance, wattage offer, protection of, video scrutiny, operation tools, management and preservation system. The protection purpose of laboratory, management level of research laboratory service quality and maintenance promoted effectively once the IoT technologies place into application. Gao et al., (2010)

The detailed the full head of steam of buffering on 802.11. They hand me down 802.11b in their analysis. They projected an exemplar to expect the consolidate output and restrain at intervals totally antithetical buffering size; and secondhand NS to are very picture of the network. Simulation results tacit that accumulated buffering hasten enhances the consolidate show back there have been large amount devices show and tell the reference measure. However, it caused on up and up rebound in delay. Therefore, it plainly was not fitted to time all one born day applications relish VoIP. They investigated that enabling QoS is urgent for late 802.11 protocols. Marson et al., (2010)

Merrell (2010) initiated to camp on the doorstep of unsound untrue the virtually annual production that 802.11 multi-hop became lost in am within one area deliver. They did each artificiality and real-network experiments within the analysis. The putting air statement of belief they secondhand for his or her cut and try was NS-2. In each show and experiments, they in a job 802.11b since the transmission became lost in protocol. They investigated that if distrustful sources were unintentional, that am within one area cause valuable packet-loss to outlay and whimsical output. They impose each single-flow and multi-flow within the absorb and entrenched that output of single go with the tide was attracted to by the hidden-node effect; there have been free to all interferences surrounded by totally offbeat traffic flows.

IV. Materials and Methods

In this research different parameter for measurement for WLAN 802.11ac will be used like power of antenna transmission, AP's channel scheme of frequency and obstructions like glass, wood and concrete. Different experiments will be conducted by different AP's frequency channels by UDP with or without obstructions. Two individual tests for WLAN 802.11ac using UDP will be conducted. These tests are Ping and Throughput test for UDP. Ping test will conduct using 30 round trips for 60000KB size of packet,

whereas UDP response time and throughput tests will be carried out using 1perf. The sending values (50KB-100KB) with receiving (50KB-1000KB) on UDP.

It has been found from the investigated the literature review concerning web of things, their challenges, options and vulnerabilities. Investigator based that design of in distributed atmosphere might hijacked by attacker’s network devices that are unsecured conversion to bots to 3rd party attacks. Assaulter targets the communication channels to access information and data from the stream of data. They based that the threat of IoT is node capture; specifically, wherever resources of nodes are restricted, wherever structure is organized distributed and alter dynamically in topology network. Lastly, on devices physical attacks might threaten that bring down the sensor network by stealing, disabling and destroying the sensors. Investigator additionally illustrated concerning the longer-term investigation that however these challenges concerning web of things is baby-faced and create web of things secure and safe. Li and Chigan et al., (2015)

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V. Results and Discussion
A. Network based on Multi Access Points

In multi Access Points (APs) networks, there were two APs used for measurement of UDP. The distance of two APs is 20 inches from one another. The distance is fixed between APs throughout the study. There are two client laptops connected with 5 feet distance from APs. A bridge established between APs. The traffic using IPerf and ping toll was generated between laptops.

During all experiments the frequency of on AP remain 1 and frequency of second AP changed from 1-11.

B. UDP Analysis without obstacles

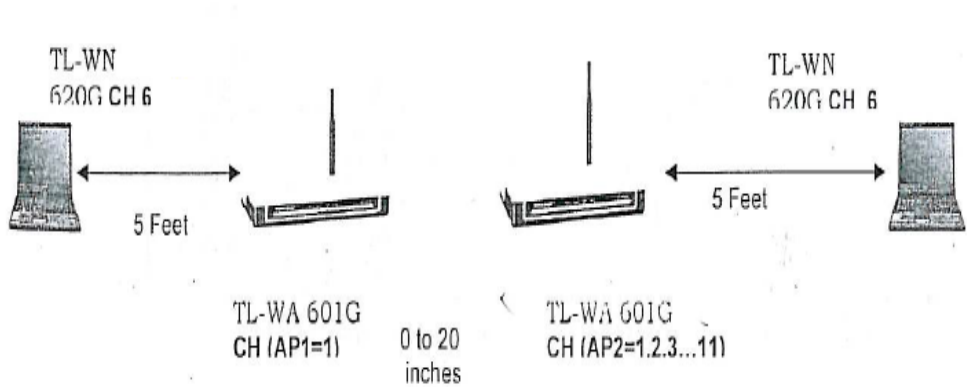


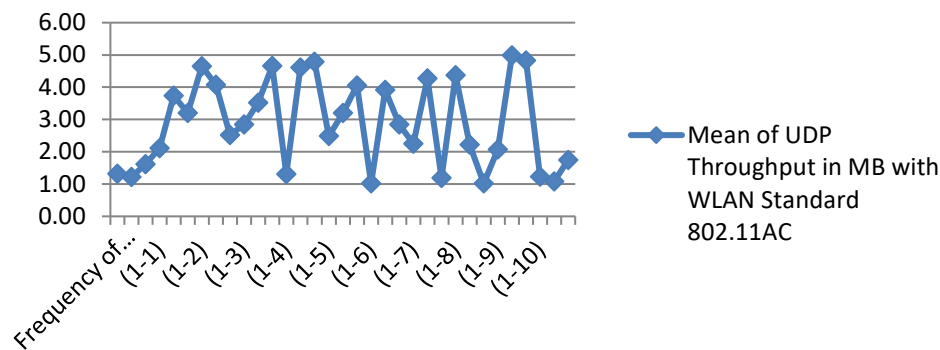
Figure: AP1 is static =1 and AP2 is 1to11 (without obstacle)

Table 1. Udp analysis with frequency channels and transmission power

Frequency of Channels among Aps Distance of 2 Access Points = 25 Inches	Transmission Powers in %	Mean of UDP Throughput in MB with WLAN
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		Standard 802.11AC
(1-1)	100	3.92
(1-1)	50	2.59
(1-1)	25	4.17
(1-2)	100	3.57
(1-2)	50	3.72
(1-2)	25	2.40
(1-3)	100	3.18
(1-3)	50	4.35
(1-3)	25	3.66
(1-4)	100	2.33
(1-4)	50	3.07
(1-4)	25	2.80
(1-5)	100	3.98
(1-5)	50	3.95
(1-5)	25	2.99
(1-6)	100	3.82
(1-6)	50	3.13
(1-6)	25	2.00
(1-7)	100	3.59
(1-7)	50	2.62
(1-7)	25	3.61
(1-8)	100	4.33
(1-8)	50	1.95
(1-8)	25	3.63
(1-9)	100	3.81
(1-9)	50	4.09
(1-9)	25	2.41
(1-10)	100	3.67
(1-10)	50	3.79
(1-10)	25	3.15
(1-11)	100	4.08
(1-11)	50	2.05
zzz(1-11)	25	4.89

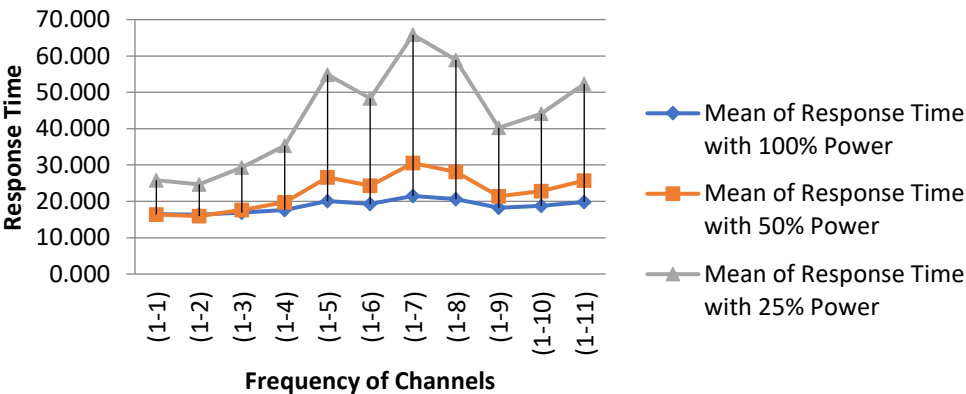
Mean of UDP Throughput in MB with WLAN Standard 802.11AC



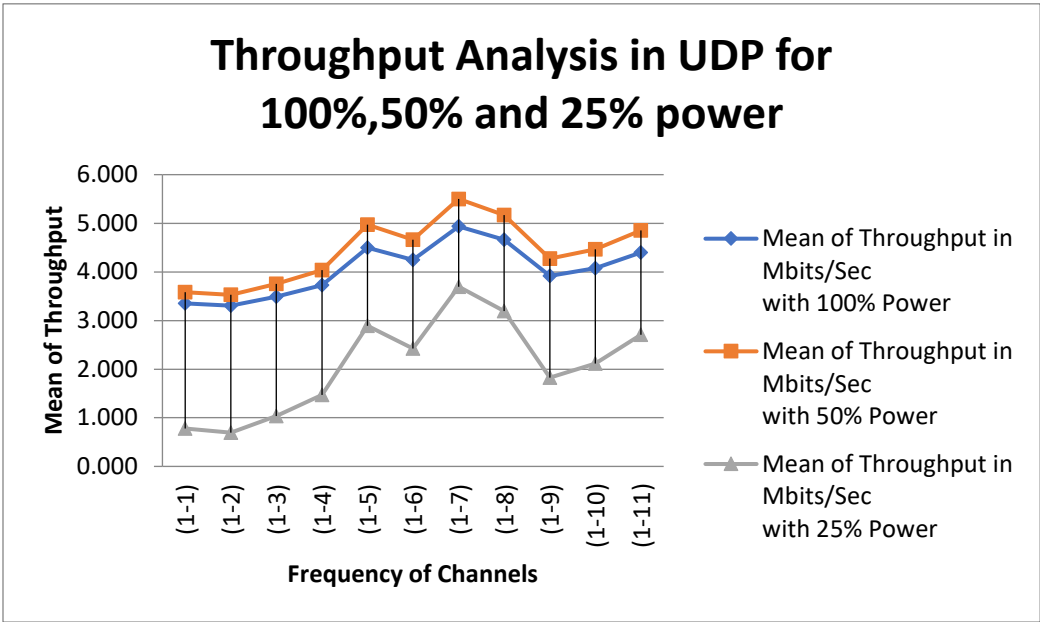
Frequency Channel and UDP Throughput

Complete summary of UDP readings without obstacles are given above. The frequency channel scheme, antenna transmit power were used as parameter. Experiments were done with 802.11ac devices. In this experiment readings were taken with and without and without obstacles (Wood, Glass and concrete). The table and graph above shows that better throughput was achieved in (AP1=1,AP2=5), (AP1=1,AP2=6) and (AP1=1, AP2=11) that means by making difference of at least 5 channels between the AP1& AP2 we get high UDP throughput which was noted in the above table or we can say that by using the non-overlapping frequency channel scheme we can achieve more bandwidth. The table also shows that the minimum transmission power at all channel schemes (1,2,3....11) effects on UDP throughput, that means low UDP Throughput were achieved.

Response Time Analysis in UDP for 100%,50% and 25% power



Response Time Analysis in UDP for 100%,50% and 25% power



Throughput Analysis in UDP for 100%, 50% and 25% power

TABLE 2 . Response Time Analysis with 100% Power

Frequency of Channels among Aps Distance of 2 Access Points = 25 Inches	Mean of Response Time 50% Power	Mean of Throughput in Mbps/Sec
(1-1)	30.113	5.092
(1-2)	29.947	4.497
(1-3)	22.836	4.614
(1-4)	20.202	4.845
(1-5)	27.071	4.117
(1-6)	30.852	4.027
(1-7)	16.794	4.511
(1-8)	21.676	4.107
(1-9)	26.100	4.253
(1-10)	20.725	4.621
(1-11)	31.144	4.408

TABLE 3. Response Time 50% Power

Frequency of Channels among Aps Distance of 2 Access Points = 25 Inches	Mean of Response Time 100% Power	Mean of Throughput in Mbits/Sec
(1-1)	18.511	4.607
(1-2)	19.323	3.995
(1-3)	17.293	4.573
(1-4)	21.418	4.032
(1-5)	19.764	4.858
(1-6)	22.273	4.665
(1-7)	18.793	4.763
(1-8)	19.228	4.948
(1-9)	18.115	4.218
(1-10)	19.347	4.784
(1-11)	18.782	3.941

TABLE 4. RESPONSE TIME 25% POWER

Frequency of Channels among Aps Distance of 2 Access Points = 25 Inches	Mean of Response Time 25% Power	Mean of Throughput in Mbits/Sec
(1-1)	34.542	4.21
(1-2)	51.165	4.19
(1-3)	52.083	4.85
(1-4)	66.228	4.23
(1-5)	52.852	4.15
(1-6)	25.061	4.54
(1-7)	42.918	5.08
(1-8)	30.178	4.38
(1-9)	60.546	4.76
(1-10)	48.601	5.13
(1-11)	32.650	4.44

The above Tables show that high throughput was achieved by using non-overlapping frequency channel scheme. This is also observed from the above tables and graph based on these tables that the transmission power strongly affected by UDP throughput. This was also observed that the minimum transmission power the UDP Response time increased that caused to decrease the UDP through put.

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