Interference Management in Wireless Fidelity Network Using Friis Model and Spectrum Analyzer

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***Abstract-** WIFI interference management over the years is now a thing of concern due to the continuous interference of signals as a result of the daily invention of technology. Today/ many technological companies are producing so many electronic devices even without the ITU standards. This also contributes to one of the major problems of WIFI technology. The problem with WIFI interference is that it creates so much disturbance in the channel, interrupting the signals due to its overlapping behaviors when the signals share almost the same channels. Many electronic hardware and software use the WIFI technology, due to no proper management of the WIFI spacing technique, these the n results in interference between the WIFI channels. The purpose of this research work is to be able to manage inter-channel WIFI interference in the Spectra-net WIFI channel. It has been known that the inter-channel WIFI interference is one of the major causes of WIFI interference. This effect leads to the overlapping of different bandwidths/ thereby creating noise. The method used in this research work to analyze this WIFI behavior is the Friis equation and the spectrum analyzer with a good frequency bandwidth allocation. From the results, it is shown that the separation between the Spectra-net and Smile WIFI was 5 channels, which is wide enough not to allow further interference. And the signal strengths were Spectra-net -45dB and Smile -46dB, the bandwidth of the Spectra-net WIFI was moved from the 2.4 GHz range to 5 GHz via router settings in order to reduce interference. In conclusion, the research work investigated the Spectra-net and Smile WIFI, and also their interference using the Friis equation and a spectrum analyzer. The research work is further recommended for proper bandwidth spacing and to create an effective bandwidth allocation system.*

***Keywords:** Wireless Fidelity, Spectra Net, Smile, Interference, Signal Strength, Bandwidth Allocation*

I. INTRODUCTION

In Wireless Fidelity (WIFI) networks, interference means the presence of unwanted signals at any active receiver. Interference exists present the receiver to successfully decode its desired signal, which reduces the achievement of data rate. It can be the cause of the broadcast nature of the WIFI signal from a transmitter. It can reach not only its intended receivers but also its neighboring receivers. Interference is a core problem in Wi-Fi networks. To address the negative effects of interference, the research scholars have been exploring interference management techniques for many years (Maraj et al, 2020). These strides have yielded a large number of results for large Wi-Fi networks.

In the future, wireless communication is anticipated to involve simultaneous interaction between thousands of devices and individuals. Interference has a major detrimental effect on the functioning of wireless networks (Maaly and Andrew, 2011),. Reducing interference in wireless networks is increasingly being recognized as a concern in today's world due to the continual deployment of larger and more complex wireless networks. In this study, we examine the interference reduction problem from the perspective of graph theory. To represent the interference reduction problem, a graph coloring technique is used. The difficulty of standard graph coloring is increased by additional constraints on graph coloring scenarios that take into account different networking situations (Obi et al., 2021). This research effort evaluates a number of algorithmic fixes for particular network topologies. It is very difficult to reduce the interference that the significant quantity of out-of-band (OOB) emission causes to the primary user (PU) in OFDM-based cognitive radio networks". For a "dynamic interference control approach in CR-OFDM systems (Hamza and Sang, 2015), they recommend an additive signal side lobe reduction methodology and genetic algorithm (GA)". An "additive signal side lobe reduction technique uses a complex array to be added to modulated data symbols in the constellation plane to reduce side lobes in an OFDM system" The "suggested technique uses GA to produce the best additive signal possible, effectively reducing OOB signal interference to the core system" (Hamza & Sang, 2015). The "impact of cover channel obstruction

(ICI) on the sensibility of the correspondence system was presented by Nisha et al. in 2014". To reduce the "impact of between channel obstacles, different night out structures" are used. To lessen the impact of between channel obstacles, we apply two night out techniques in this model. To lessen the impact of ICI in the channel, in reverse isolation is first applied at the beneficiary using the Base Mean Squared Mess up (MMSE) change approach. Second, to decrease the impact of ICI in the channel, they applied the least mean square (LMS) equalizer at the beneficiary. These methodologies are used to change the effect of between channel deterrent, which the channel's inspiration response brings into the structure. Over the years, the service has improved the quality of signals the user gets.

Statement of the Problem

Economic and political developments are driven by communication technologies. However, interference in WIFI network is an unwelcomed nuisance to the systems' quality of service (QoS) example: email Therefore, this study seek to review the techniques in the reduction of interference and improve the systems quality of service encountered in Spectra net Wi-Fi network. One of the most terrible form of WIFI interference is due to the inter channel switching creating disturbances in the WIFI receiver.

Aim of the Study

The aim of this study is Interference Management in Spectra net Wi-Fi network using Friis model

Objectives of the Study

The objectives of this study are to

i. analyze the Inter-channel Interference using Friis model and spectrum analyzer
ii. evaluate the Inter-Channel Interference of Spectra net WIFI channels
iii. analyze the interference power and Transmitted power of the WIFI signal.
iv. establish the interference management techniques in smile and spectra net networks

Types of Interference

In this study, three types of interference may be discussed. They are self-interference, multiple access interference, Co Channel interference (CC1) and Adjacent Channel Interference (AC1)

Self-Interference

This happens considering signal interference coming from a shared transmitter. The quantity of interference that is caused here depends on the type of modulation. In OFDM self - interference among sub carriers occurs due to the frequency of the carrier offsets caused by oscillator mismatches, Doppler effect, and fast fading, caused by transceivers motion (Obi *et al.,* 2021). They proposed that inconsistency may other than be a wellspring of self-interference. In the Full Duplex (FD) system, check among uplink and downlink transmissions may in this way be classified as self-interference since it impacts signals sent over a relative two-way connection. Duplex filters is the cause of this interference. By selecting the physical layer numerology such that the operating conditions and implementation technology are considered, its impact (self-interference) may be reduced (Emeruwa & Ekah, 2018).

Multiple Access Interference

Since it is invited on by various Wi-Fi signs to a lone recipient using a for all intents and purposes indistinguishable intermittent resource, the impedance is known as different gets to. In any event genuine layer speculatively permits changed various gets to, soon this is absurd considering synchronization issues, RF circuit deserts, and the effects of the remote causing channel. Power control is all things considered used to ensure sensibility in different access conditions.

Co-Channel Interference

Co- Channel Interference (CCI) is among the links that reuse the same frequency bands (channel)). In the case of cellular system, this is sometimes referred to as inter cell interference. The impact of CC1 can be diminished by employing fixed frequency re-use plan (Emeruwa & Ekah, 2018).

Frequency reuse, mimo techniques interference alignment, and adaptation to interference variation are standard systems for CC1 control in Wi-Fi networks. A high frequency re-use factor means a constant data rate across the service area (Emeruwa & Ekah, 2018). Clients at various locations of the cell experience similar throughput in view of this ceaseless circumstance, which also impacts the assistance with rating dispersal.

Considered transmitter experience is another strategy for truly zeroing in on co-channel assumption. Network mimo is the name given to such structures in the relationship for research (Emeruwa & Ekah, 2018). Mimo is standard in networks for current truly check coordination out. Likewise, controlling check across networks moved by various heads increases establishment costs as well as affiliation interconnectedness, which controllers a fundamental piece of the time battle with to stay aware of business opportunity. It is still unrefined that coordination in faraway broadband plans will help bosses when the expense and block for impedance coordination are thought of.

In this survey, we address the operator's benefit of downlink interference coordination in two aspects:

ii. Multi-cellular coordination with no interference from neighboring operators
iii. Inter-operator coordination in shared spectrum.

A "techno-economic analysis frame work was developed in other to deal with interference and cost trade off analysis, and reform the model. Numeric result indicates that the economic benefit of multicellular coordination significantly depends on propagation condition and average user demand level (Emeruwa & Ekah, 2018). Up to a particular average level, a self-deployed WLAN network may be the cheapest option in closed area. The new turn of events, joint processing scheme in a cellular domain may be a viable solution on a demand level or in an open area. The drawback is that it requires extremely verifiable channel state information (CSI) of the transmitter. Taking into account business opportunity and uneven test for range responsiveness inside seeing between movement check, hapless cell networks are legitimate going to make with near nothing or superfluous intrigue level revenue. Obviously, with the other extra, an organization that is made game plans for more major sensibility and higher change power will help more. Regardless of what the way that hilter kilter challenge awards horrible show up at use, offering reach to marvelous geographic get-together can be more sensible than static coordination, comparatively correspondingly almost likewise with a standard show up at split (Emeruwa and Ekah, 2018). The sure benefit to the performance can be moreover enabled by close planned work to achieve a typical goal.

Adjacent Channel Interference

Adjacent channel interference (ACI) occurs when the power from a signal in a channel adjacent to it causes interference to another signal in a different channel. There are several reasons why ACI may occur, for example in frequency modulated (FM) systems, incomplete filtering may lead to ACI. Furthermore, an inadequate frequency control in either the interfering channel or the reference channel may also lead to ACI. In some cases, interference avoidance schemes can be used to avoid ACI. For instance, while the 2.4 GHz Wi-Fi band supports a total of 11 channels, it is recommended that Wi-Fi users in the United States utilize non-overlapping channels (take for example: channels 1, 6 and 11) (Kajita et al., 2016).

2. Causes and Benefits of Wi-Fi Interference

Causes of Interference

In 1997, Wi-Fi was first made open to the general public. By far, most people think that it exists since it has had an exceptional effect in ensuring that we are related with the web at home, work, and, marvelously, out in the open (Emeruwa & Ekah, 2018).

Wi-Fi is very not excused from the undertakings that go with progress, with Wi-Fi issues being maybe of the most unpreventable issue about present day coordinating. There may be an issue irrelevant to Wi-Fi.

If any of the following is noticed, it is enough to consider Wi-Fi interference being the case.

i. Low signal strength even when, nearer to Wi-Fi broadcast device.
ii. A much slower connection to the internet when Wi-Fi is connected.
iii. Slow file transfers between computers over Wi-Fi.
iv. Inability to pair Wi-Fi or Bluetooth devices even when closer to the receiver.
v. Frequently dropping your Wi-Fi connections.

Issues related with Wi-Fi interference can be split into some major areas.

1. Physical obstructions: Constantly, there is certain spot within a building or area where you cannot seem to reach any reasonable Wi-Fi signal no matter where the device is placed. Physical barriers such as the materials a building is constructed with is one of the most likely reasons for a wifi signal not being able to reach your device (Ajayi *et*

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*al.,*2019). Below in Table 2.1 is a list of common building materials and their level of interference they caused.

II. BENEFITS OF WIFI

Proper interference management in Wi-Fi or wireless networks will improve the reception of signals. The study will be of significance to the Nigerian communication authorities, the government and the private sectors in the telecommunication business. Its importance to the communication industries arises from the fact that the analysis will show how to improve Wi-Fi or wireless network detection, prevention and subsequently elimination of interference in this direction. Researchers are another set of beneficiaries; this is because the findings from this study will stimulate further research in the broad field of telecommunication

III. MATERIALS AND METHOD

Materials
Spectra-net Modem
Smile Modem
Spectrum Analyzer

Method
The method used for analyzing the WIFI channel is the spectrum analyzer measurement method and the Friis model.

Table 3.1 shows the signal strength of the Spectra net and Smile WIFI signal strength for two months. The table is divided into two sections; the first section is for the first month, and the second section is for the second month.

S/No	Spectranet wifi strength 1st Month (-dB)	Smile wifi strength 1st Monrh (-dB)	Spectranet wifi strength 2nd Month (-dB)	Smile wifi strength 2nd Monrh (-dB)	Spectranet Wifi Covered Channels	Smile Wifi Covered Channels	Distance of spectrum analyzer to the Wifi Modules (m)	Signal Power (mW)	Noise Power(dB)
1	-45	-43	-43	-64	0-3	6-10	1	100	5
2	-34	-54	-34	-54	2-5	6-10	1	100	5
3	-58	-34	-58	-64	4-8	6-9	1	100	5
4	-45	-65	-45	-56	4-8	10-14	1	100	5
5	-87	-96	-47	-36	0-3	10-14	1	100	5
6	-40	-56	-40	-28	0-3	10-14	2	100	5
7	-40	-78	-60	-74	4-8	7-11	2	100	5
8	-56	-84	-56	-63	6-10	7-11	2	100	5
9	-56	-83	-76	-44	6 -10	7-11	2	100	5
10	-73	-74	-43	-35	6-10	12-15	2	100	5
11	-48	-65	-48	-36	0-3	12-15	2	100	5
12	-56	-46	-66	-44	0-3	8-12	3	100	5
13	-56	-54	-36	-36	0-3	8-12	3	100	5
14	-73	-56	-44	-49	2-5	8-12	3	100	5
15	-48	-59	-57	-58	2-5	8-12	3	100	5
16	-56	-78	-34	-46	8-12	3-5	3	100	5
17	-56	-76	-59	-79	5-9	3-5	3	100	5
18	-74	-79	-77	-58	5-9	3-5	5	100	5
19	-57	-58	-43	-68	5-9	0-3	5	100	5
20	-34	-68	-64	-38	3-7	0-3	5	100	5
21	-59	-58	-55	-49	3-7	0-3	5	100	5

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22	-67	-89	-65	-34	3-7	10-13	6	100	5
23	-43	-34	-46	-66	1-4	10-13	6	100	5
24	-54	-56	-64	-55	1-4	10-13	6	100	5
25	-45	-45	-56	-45	1-4	6-10	6	100	5
26	-65	-65	-57	-44	2-5	6-10	6	100	5
27	-46	-76	-49	-54	2-5	6-9	10	100	5
28	-64	-54	-47	-78	2-5	6-10	10	100	5
29	-56	-78	-75	-54	2-5	6-9	10	100	5
30	-73	-54	-76	-48	0-3	5-8	10	100	5
31	-58	-56	-78	-66	0-3	5-8	10	100	5

WIFI Analysis

Even for channels that do not overlap, the channel masks partially overlap. When multiple networks are active in the same area, some inter-channel interference is always present in the system. The power of the interference signal's final level is highly influenced by a number of factors. The distance is crucial because as the distance between Wi-Fi sites grows, the received power level falls. Interferences cause two negative effects. As interference power is considered as noise within the transmission channel, the signal-to-noise ratio first declines. Since the sources that produce the thermal noise and the interference power are unrelated, we may compute the summed noise as the product of the power densities of the two sources (Roberto et al., 2015):

$$p_{noise} = p_{int} + p_{white\ noise} \quad (1)$$

The "noise power diminishes the channel throughput; the throughput is the most important parameter determining the quality of service (QoS) of the transmission". The "channel throughput could be described by the following formula":

$$c = BIn\left(1 + \frac{P_{signal}}{P_{signal}}\right) \quad (2)$$

"Where B represents the bandwidth of the transmission channel. The second disadvantage of interference, especially when its signal power is relatively high, is the effect of the spurious carrier detection; the high level of interference power blocks the transmission channel. Some methods of interference level reduction are discussed in the next section".

Where N is the number of available channels. The second solution suggests the reduction of transmitted power, but as a side effect, a decrease of coverage occurs. This solution reduces the interference power level, but on the other hand, leads to dead areas with no network coverage, Transmitted Power and Interference Power Correlation

The basic equation, which describes the radio wave distribution in a free space is the Friis formula (Roberto et al., 2015):

$$p_{rx} = \frac{P_{tx}\, G_{rx}\, G_{t}\, \lambda^2}{4\pi r^2} = \frac{P_{tx}\, G_{rx}\, G_{tx}\, c^2}{4\pi r^2 f^2} \quad (3)$$

This formula allows us to calculate the received power (P_rx) depending on the transmitted power (Ptx), the gains of receiving and transmitting antennas (G_tx, G_rx), the channel frequency f and the distance between the transmitter and receiver (in so called free space, the r power is equal 2):

$$p_{rx}(r) = \frac{k}{f^2 r^2} \quad (4)$$

Using the formula (4) we can calculate the attenuation of WIFI signal in a free space:

$$P_{radb}(r) = P_{tx} G_{rx} G_{tx} l_{fspl} \quad (5)$$

$$l_{fspl} = \frac{c^2}{4\pi r^2 f^2} \quad (6)$$

The free space WIFI signal l_{fspl} could be presented in the logarithmic scale:

$$l_{fspl}[dB] = -10 log l_{fspl} \quad (7)$$

and finally we obtain the following formula:

$$l_{fspl}[dB] = 32{,}44 + 20 log r[km] + \log f[GHz]$$
(8)

where r is in [km] and f in [MHz]. The more general formula takes the following form (Roberto *et al.,* 2015):

$$l_{fspl} = \frac{c^2}{16\pi\alpha^2 f^2} \quad (9)$$

The α coefficient is rather unstable and very sensitive to the environment, e.g. it changes strongly in room temperature. The coverage in the 802.11n standard is determined by the minimal received power (received signal sensitivity), which is necessary for obtaining the required level of throughput.

Interference Power Level

All stations are presumed to be transmitters in this assumption. A station may be located anywhere between the region's canter and its perimeter within the cell (coverage area). The sum of the interferences from stations S1 and S2 was used to calculate the interference power level.

$$p_{int} = \sum_{x=1}^{2} p_{intx} + p_{white\ noise} p_{nf})$$

$$P_{white\ noise}(f) \quad (10)$$

White noise or thermal noise within the channel bandwidth could be described as:

$$= kT[\frac{w}{Hz}] \quad (11)$$

T denotes the environment temperature in K degree, while k is a Bolzman constant. Threshold of white noise in 1 Hz bandwidth at 0 Kelvin degree is -228.6 dBW. White noise in B bandwidth can be calculated as:

$$p_{white\ noise}[dB] = 10\log(KTB) \quad (12)$$

The white noise in 2.45 GHz channel at 17 C degree could reach the following level:

$p_{white\ noise}(T = 17$ degrees Celsius, B=2.45GHz) = -174+10logB=-131dBm. (13)

The following formula was developed by the authors to calculate the received power:

$$p_{received}(r) = M[f - 2412 - 5(k-1)] + p_{transmitted} - (-27{,}56 + 10 \propto log r[m] + 20 log f[GHz]) + G_{sum} \quad (14)$$

p received and p transmitted is denoted by Prx and Ptx respectively. The mask (filter) of the pertinent channel is represented by the M(f) function. While the signal below the mask characteristics is allowed to pass, the signal outside the mask is destroyed. The maximal internal level of interference is to be determined by the mask feature, according to the authors. G sum is equivalent to the system's additional gain, which takes into account the influence of the receiver's and transmitter's antennas, as well as the gain related to modulation, coding, and various signal dispersion types.

Determining of the Spectra-net and Smile WIFI Interference From Friis equation, we can express the WIFI interference as:

$$rx_{spectranet} = \frac{P_{tx} G_{rx} G_{tx} \lambda^2}{4\pi r^2} \quad (15)$$

$$rx_{smile} = \frac{P_{tx} G_{rx} G_{tx} \lambda^2}{4\pi r^2} \quad (16)$$

$$wifi_{interference} = R_{x_{spectranet}} + R_{x_{smile}} = \frac{P_{tx} G_{rx} G_{tx} \lambda^2}{4\pi r^2} \quad (17)$$

IV. RESULTS

Spectra-net WIFI

As shown in Figure 4.1 is the strength of the Spectra-net signal in a particular location in Port Harcourt. From the graph, the signal of the Spectra-net is shown at -60dB expanding to 3s. This shows that the Spectra-net signal in this location is observes a zero interference due to no WIFI signals present in that location. Spectra-net WIFI signal is known as a wireless fidelity signal which is used in accessing the internet. When the WIFI channel is interfered, that means the signal quality becomes poor to be used and frustrating, and it becomes frustrating using it becomes a problem due to the channel interference. However, interference is a major problem in communication, mostly in wireless technology, due to signals in the free space having almost the same bandwidths or different bandwidths. So as the wireless communication signals increase chances for WIFI to be interfered. But from the result shown in Figure 4.1, it describes the Spectra-net signal to be operating under a noninterference condition, thereby having it best time for communication harnessing.

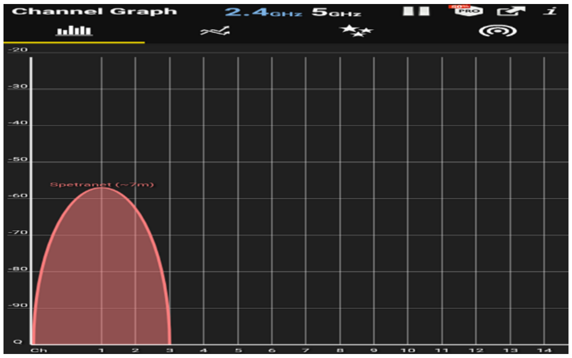

Figure 4.1: Spectranet WIFI

Smile WIFI

The result in Figure 4.2 shows the response of Smile network when it was on. The result displays the WIFI channel to be operating from the 4th channel, in order to avoid interfering with the Spectranet WIFI, it covers channel 1 to 3. The result also shows that the Spectranet has a wider range of coverage on the spectrum. The smile WIFI is another WIFI channel that could be subscribed to with good quality. However, this research work only considers the behavior of the channel under interference situation with the other WIFI channels, the graph below shows the Smile WIFI sitting on its channel alone without interference from any other WIFI signal. That is to say that at this point is the best time to harness the WIFI without any form of interference.

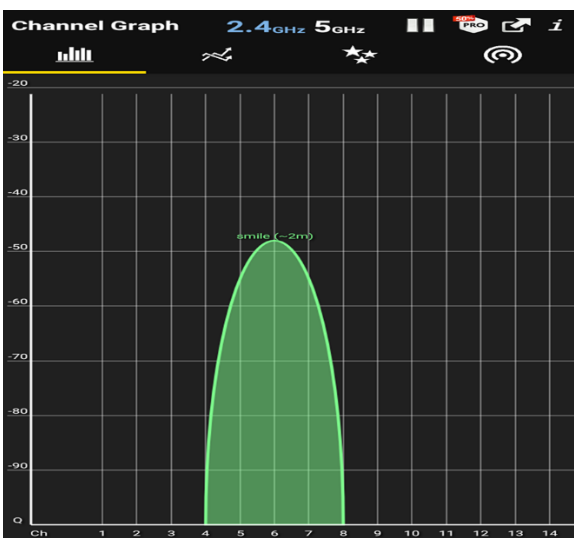

Figure 4.2: Smile WIFI

Spectranet and Smile Interference Results on Spectrum Analyzer

The results shown in Figure 4.3, the spectrum analyzer shows that the spectrum analyzer was also able to analyze other WIFI signals around the location of the Spectranet and smile WIFI. The spectrum analyzer shows that the Spectranet ~~and~~ Smile WIFI signals were interfering when they were in same location due to the fact that these two WIFI channels are operating on same frequency. It is also shown that the other WIFI that were analyzed were not interfering with the Spectranet and smile due to the different bandwidth operation.

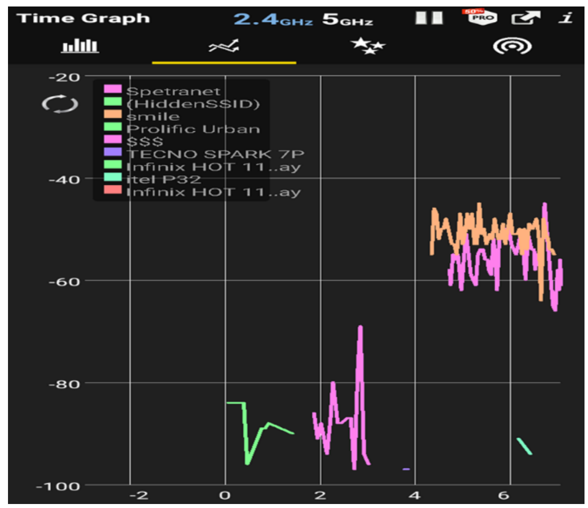

Figure 4.3: Spectra-net and Smile interference

Spectra-net and Smile Channels Overlap

The spectrum analyzer in Figure 4.4 shows the overlapping channels of the Spectra-net and smile WIFI. This is so because the both WIFI share same frequency. These frequencies are as a result of their operational bandwidths. Once, more than one channel shares the same bandwidths, the tendency for them to interfere is very high, whenever their locations are closer to each other. From the spectrum analyzer, it can be shown that the WIFI channel interfered at channel 11 and 13. The overlap is said to be a serious overlap due to the level of its interference. These level of interference will create a lot of noise at the receiver.

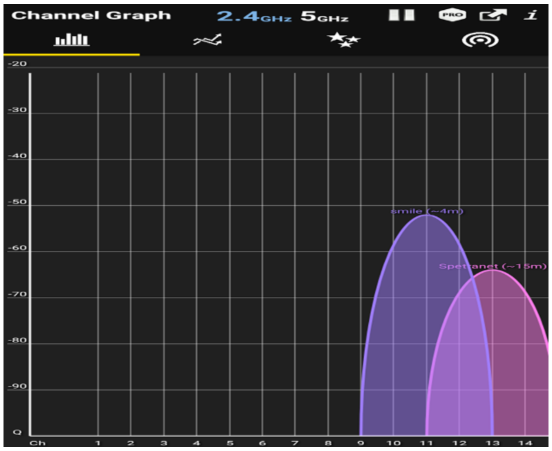

Figure 4.4: Spectra-net and Smile WIFI Channel Overlap

Spectra-net and Smile WIFI interference

The WIFI interference as shown in figure 4.5, the spectrum is very high due to the level of overlap between the spectra-net and smile channel. As shown in the figure, the spectra- net WIFI stretches from 0 to 3rd channel and while smile WIFI stretches from 0.5 to 4th channel. This shows that the interference is high and with a lot of noise in the spectrum. The interference of this wifi signals shows the example of signal overlapping. At this point the interference is very high due to the degree of overlap which will results to signal jamming, noise and thereby reducing the signal to noise ratio of both WIFI receivers.

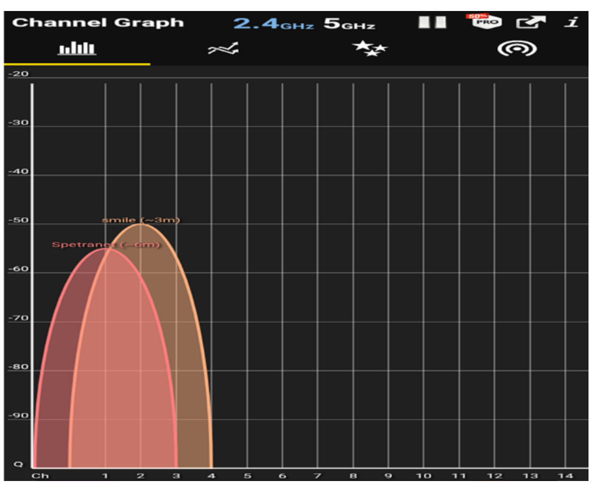

Figure 4.5: Interference of WIFI Channels

Reduced Interference

As shown in Figure 4.6 In order to reduce interference in the channel, a bandwidth WIFI management channel technique was introduced to completely move Spectranet to another bandwidth a bit higher than that of smile since the WIFI currently covers up to 5 GHz. The filter is to separate the Spectranet and smile WIFI along the channels. These procedures help in reducing the interference at the receiver of the WIFI signal. From the result, it shows that Spectranet and smile WIFI on the spectrum analyzer are not interfering. The Spectranet covers the 0 to 3rd channel at -46dB while the smile WIFI covers the 9th to 13th channel at -45 dB. The result in the spectrum analyzer shows that the two networks are operating separately without interference.

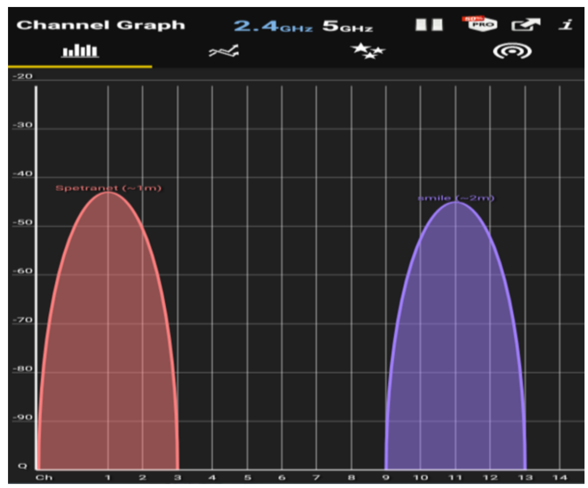

Figure 4.6: Reduced Interference

Figure 4.7 shows the level of signal strengths after the interference reduced it as shown, the available signal strengths is within the range of useful signals

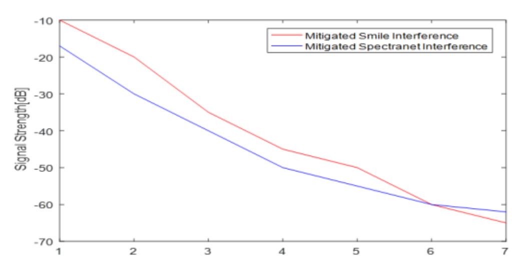

Figure 4.7 Signal Strength after interference Mitigations (Researcher's Desk, 2023)

From the results in Figure 4.8 and 4.9, it is clearly shown that the signal strengths changes due to distance and days as a result of weather conditions. It is also shown that when the distance of the wifi receiver is closer to the wifi module, the signal strength increases and when the wifi receiver is a bit farther from the wifi module the signal strength reduces. Sometimes the day also affects the signal strength of the wifi which might be due to weather condition or too much traffic on the wifi channel. It has been observed that when the wifi subscribers are many then signal strength can depreciate due to excessive usage of the channel. From the results on the first day of the month, it is shown that when Spectranet records -45 dB at 1 meter distance then smile records -43dB at 1 meter distance and on the last day of the month, smile has a signal strength of -56 dB at 10 meters distance and Spectranet -58dB at 10 meters distance.

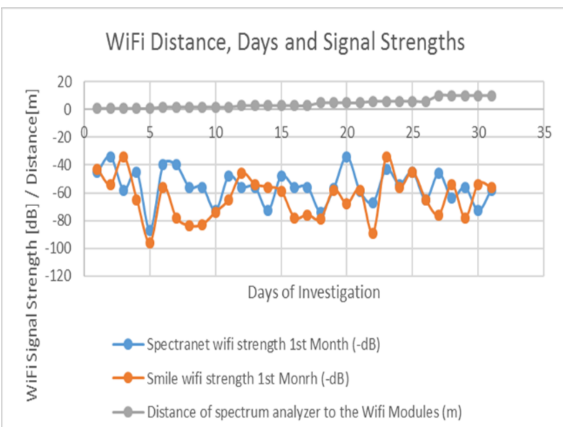

Figure 4.8 1st Month Wifi Distance, Days of investigation of Signal Strengths (Researcher's Desk, 2023)

Figure 4.9 indicates the second month of the signal strengths investigations. These investigations took 31 days to be carried out on both wifi channels such as smile and Spectranet modules. The signal strength of the wifi signal was -43 dB at 1 meter distance for Spectranet, and -64 dB at 1 meter distance for smile wifi, and the last day of the investigations, it was observed that the Spectranet had a -78dB at 10 meters distance and smile recorded a -66dB at 10 meters.

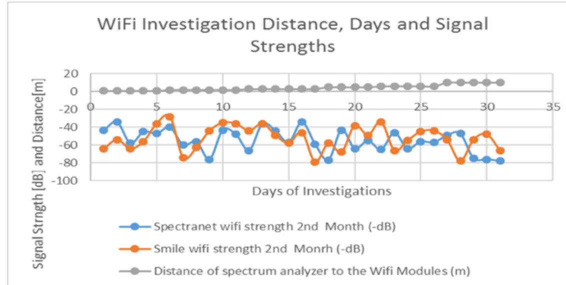

Figure 4.9: 2nd month of Signal Strength investigations (Researcher Desk, 2023)

CONCLUSION

This research concludes that:

- One of the major causes of WIFI interference is inter-channel interference.
- This type of WIFI interference produces an overlapping bandwidth that creates disturbances on the received desired WIFI signal.
- The causes of these interference issues are based on overlapping WIFI bandwidths.
- This overlapping bandwidth majorly takes place when the WIFI signals of a music box and a WIFI signal of a biometric detector are almost close to each other.
- These effects therefore cause interference which leads to noise.
- This research work also considered the spectrum analysis of the WIFI channels using the spectrum analyzer.
- With the spectrum analyzer the Spectra-net and smile WIFI were all analyzed at different categories such as when the signals were overlapping and when the signals are alone without interference, the FRIIS equation was used to analyze the transmitted WIFI channels and its interference with other WIFI channel. It was shown that the Spectranet and smile WIFI were interfered at same bandwidths and same locations

In order to reduce interference between the WIFI channels, a proper bandwidth management scheme was introduced to manage the interference by improving the bandwidths of Spectranet thereby making it higher than smile. When this was done it was now shown in the results that the both signals are no longer interfering.

RECOMMENDATIONS

This research work has made a significant reduction, however is subject to further recommendations as follows:

* Proper bandwidths spacing
* Create an effective bandwidths allocation system

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