https://dx.doi.org/10.4314/dujopas.v10i1a.20
ISSN (Print): 2476-8316
ISSN (Online): 2635-3490
Dutse Journal of Pure and Applied Sciences (DUJOPAS), *Vol. 10 No. 1a March 2024*

Received Signal Evaluation for Ultra High Frequency (UHF)Terrestrial Television; Case of Ekiti State, Nigeria

Ayodele Sunday Oluwole[1], Olumayowa Ojo[2], Olaitan Akinsanmi[3]

[1, 2,3]Department of Electrical & Electronics Engineering,
Federal University Oye Ekiti,
Nigeria

Email: asoluwole@gmail.com

Abstract

This paper presents the evaluation of the received signal for UHF channel 41, (transmitting frequency of 631.25 MHz) and Star-times (transmitting frequency of 618 MHz). Using a Digital Field Strength Meter, the signal strength from the two UHF Transmitting Stations was measured throughout the state along two routes. The elevation, geographic coordinates, and line of sight of the various data points from the base stations were determined using a global positioning system (GPS) receiver. Regression analysis and correlation were used in the signal assessment process. Analysis of the data collected from the field measurements indicated that as line of sight increases signal strength reduces along all the routes for Ekiti Television (EKTV) and Star-times except along Route B for Star-times. Line of Sight and Elevation have a strong negative connection in almost all routes except along route A for star-times. Elevation and Signal strength correlation indicated negatively very high except for that along route B for EKTV and route A for Star-times. Regression analysis revealed that variance in Line of Sight and Elevation accounted for high significant changes in signal strength for EKTV and consistently very high changes for Star-times. Generally, it was observed that distance from the base station, topography/elevation, power of the transmitter, nature of signal (Digital/Analog) as shown for regression analysis and other factors affected the quality of service of the propagated signal. Terrestrial Television stations should ensure they transmit with the standard parameters. To improve service quality, the transition from analog to digital should be accelerated in Nigeria such that most stations transmit via the standard Digital method of transmission.

Keywords: Evaluation, Received Signal, Ultra High Frequency, Terrestrial Television, Ekiti State.

INTRODUCTION

Television can be delivered in many ways ranging from terrestrial television, cable Television, satellite television, streaming through Internet and other technologies. Terrestrial television broadcasting operates on the analogue and digital transmission and reception technology, the Digital Terrestrial Television (DTTV) Technology was suggested in an effort to maximize frequency spectrum by freeing the upper UHF bands for broadband services. Terrestrial television is transmitted by radio wave propagation. The study of the transport of energy at radio frequencies from one site, a transmitter, to another, a receiver, is referred to as radio wave propagation. Radio waves are part of the electromagnetic spectrum (300MHz to 3GHz), which ranges from very low to extremely high frequencies (Omolaye, *et al*, 2015).

**Author for Correspondence*

Ultra- High Frequency
Signals on the UHF broadcast band are sent by space wave, which travels in a direct line of sight from the transmitter through the troposphere. The transmitter output power or effective isotropic power of the transmitter (EIRP), transmitting antenna height, and the nature of the signal route are all factors that influence the quality of the signal received from the transmitter in the UHF band. Other factors include the distance between the transmitter and the receiver, the elevation of the receiver, the gain of the receiving antenna, and the receiver's quality. Precipitation and vegetation also have an attenuation impact on UHF signals.

Signal Strength
Signal strength is defined as the amount of transmitter power received by a receiving antenna at a distance from the emitting antenna. The signal intensity of electromagnetic waves decreases as they travel through the surroundings, hence the need for prediction of the received signal strength In any wireless radio communications link, the strength of the signal leaving the sending antenna is not the same as the power of the signal arriving at the receiving antenna.

Regression and Correlation Analysis
Regression and Correlation are statistical methods used to compare two or more variables. Regression uses the existing data to define a mathematical equation which is used to predict the value of one variable based on the value of other variables. Regression models could be simple, linear, legit, multivariate etc. For one dependent variable and one independent variable, simple linear regression is utilized. Linear regression is a basic form of protective analysis used to test a relation between two variables by fitting a linear equation (Zakaria *et al,*2021)

Correlation analysis is used to determine the strength and direction of the linear relationship between two variables. A positive correlation between two variables means that increase in one variable leads to an increase in the other. Negative Correlation between two variables means that the increase in one variable leads to a decrease in the other. No correlation exists when one variable does not affect the other. The correlation coefficient is the unit of measurement used to calculate intensity in the linear relationship between the variables involved in a correlation analysis, represented with symbol r is usually a value without units located between 1 and -1. Several types of correlation coefficient exist such as Spearman, Kendall and Pearson. Spearman Rank and Pearson Coefficient. Pearson’s coefficient was used in this work.

There are several forms of correlation coefficients, including Spearman, Kendall, Pearson Coefficient and Spearman Rank. In this paper, Pearson's coefficient was applied.
Ngala *et al*. (2012) performed research on the Kwame Nkrumah University of Science and Technology campus, collecting received signal strength indicator (RSSI) data from certain chosen APs on the campus under LOS and NLOS environment scenarios. Using least-square regression analysis, the path loss exponents, standard deviation, and root mean square error for different environment scenarios were calculated. The results were compared to other published results and found to be in good accord. Empirical models (prediction) for LOS and NLOS situations were developed and verified by comparing them to existing models such as COST231 Hata, Stanford University Interim, and Free Space Loss. The comparison findings were found to be adequate, indicating that the obtained models can be utilized for effective deployment of wireless networks at KNUST.

Akinbolati *et al*.,2017 used two receiver antenna heights to evaluate the variability in DTTV signal strength values with elevations of the research locations. The signal of a Digital Terrestrial Base Station (DTBBS) in Akure (Latitude 7°15'09''N and Longitude 5°07'53''E) South West, Nigeria was measured at 1km intervals along three selected radial routes around the base station for both dry and wet seasons using a Digital Satlink Signal Meter Model WS-6936 connected to a DTT UHF receiving antenna. A GPS receiver (Garmin Map 78s) was utilized to measure the geographic coordinates and heights of data sites as well as to monitor the line of sight with the station as a reference. The signal strength's variations with distance and height was displayed and examined. The results demonstrated that greater values of data point elevation improve Quality of Reception (QoR) in the studied locations, but lower values worsen QoR. The higher the elevations of sites, the greater the Received Signal Strength (RSS) for all routes and for both seasons. When a receiving antenna height of 3.0 m was utilized, the signal intensity at the macro cell was greater than when a receiving antenna height of 1.5m was used. This is because using high receiving antenna heights lowers attenuation effects caused by many paths. Overall, the outcome is beneficial for DTTV transmission and reception in the studied locations.

Igbinosa et al., 2019 provide field measurements taken in Abuja at 645.00 MHz (station 1) and 698.00 MHz (station 2). Each TV station's measurements were acquired with a portable RF field strength spectrum analyzer and a Garmin 72H GPS receiver. In this paper, we evaluated the performance of 10 path loss models and compared them to a path loss model based on propagation data from chosen TV stations. The pathloss models were exposed to performance measures such as Mean Prediction Error (MPE) and Root Average Squared Prediction Error (RASPE). The RASPE is the most visible indicator for measuring predictive model error. Furthermore, the eight available prediction models produced RASPE values greater than 10dB.

Akingbade et al. (2013) anticipated the path loss of a UHF channel over three routes in Akure using existing models (Friis, Okumura-Hata). Broadcast signal field strength measurements were collected along each of the three routes. To identify the best model for the city, measured data were compared to the predictions of other models.

Friis' transmission equation has a significant mean path loss error and so greatly underestimated the path loss. Okumura-Hata's model has better agreement with measurement findings and reduced mean path loss errors. Hata's model is better acceptable for use in path loss prediction in Akure metropolis, with the least error of 19.17 dB. As a result, a modified Hata' model was created that engineers may use while developing radio communications systems.

Bakare *et al*,2020 presents the prediction of signal attenuation Digital Terrestrial Television (DTTV) in Port Harcourt, Rivers State, Nigeria A signal Tracker (WS6916), Micronix Global Positioning System (GSP) module alongside a drive test was used to carry out the research work at Star times office, Olu-Obasanjo Road. The Power Density change with the varying distance between the receiver and the transmitter (Nobe B). For a more concise measurement, readings were taken between April and August, 2019 (wet season) at different times of the day. The path loss exponent (n) of 4.7 reveals that Olu-Obasanjo Road is an urban area. As the location changed, the path loss exponent (n) increased to 15.4, revealing the interference of tall buildings, and other forms of obstruction. The exponential shape of the graph shows a decaying signal along the distance axis with distance, expatiating that the inverse relationship between powers received (dbm) and distance (km). Attenuation was observed to have increased while increasing the distance between the transmitter and receiver. Factors of precipitation, such as rain, moist air, and meteorological factors of the atmosphere greatly affect the broadcast of Digital Terrestrial Television (DTT). The results obtained were analyzed using the log-distance empirical model to obtain both the parameters of Path loss exponent and the Mean Square Error (MSE).

METHODOLOGY

Instrumentation

The field strength was measured using a Digital Field Strength Meter, RF Explorer Handheld Spectrum Analyzer, while the elevation, geographic coordinates, and line of sight of the various data locations from the base station antenna were measured using a Global Positioning System Receiver (eTrex 30 Garmin GPS receiver).. For the field campaign, a field vehicle with a receiving antenna, I-Connector, Coaxial Cable were used. An administrative map of Ekiti State was also employed as route guide.

(a) (b)

Figure 1 (a) e trex 30 Garmin GPS (b) RF Explorer Handheld Spectrum Analyzer

Field measurement of major axes from the base stations

Two major routes from the base stations in Ado -Ekiti was defined for the evaluation. Measurements were taken at intervals across the major axes from the base stations, as well as in the majority of towns and villages throughout all local government regions. Throughout the journey, the GPS identified the location's Line of Sight, longitude, latitude, and elevation, while the Field Strength Meter measured the field strength. The electric field intensity values, geographic coordinates, height above sea level, and line of sight of the numerous data points were all collected and compiled for study. Transmission parameters were kept constant by the transmitting station throughout the period of from July 2023 - October 2023 measurement.

Table 2.1 Startimes transmission characteristics

S/N	PARAMETER	CHARACTERISTICS
1	Base Station Frequency	610,618,620 (MHz)
2	Base station Geographic Coordinates	Latitude: 7^0 37.895 Longitude 5^0 11.632
3	Base Station Elevation	478 meters
4	Transmitter type and power	NEC 2.6KW
5	Height of Transmitting Mast	500 meters
6	Base Station Transmitting power	2.6KW
7	Transmitting antenna gain	

Table 2.2 EKTV transmission characteristics

S/N	PARAMETER	CHARACTERISTICS
1	Base Station Frequency	613.25 MHz
2	Base station Geographic Coordinates	Latitude - 7^0 40.487 Longitude- 5^0 14.815
3	Base Station Elevation	373 meters
4	Transmitter type and power	HARRIS MAXIVA 20KW
5	Height of Transmitting Mast	200 meters
6	Base Station Transmitting power	5 KW
7	Transmitting antenna gain	15dB
8	Transmitting Antenna Height	13 metres

Table 2.3 Routes definition

S/N	Routes
A	Ado – Iworoko -Ifaki – Ayegbaju- Oye- Ilupeju- Itapa, Osin- Ikole
B	Ado – Iyin – Igede- Aramoko- Erio - Efon Alaaye

Analysis of Signal Strength

Data obtained was used to draw charts representing curves to show Elevation, Signal strength and Line of Sight profiles. Analysis of Signal Strength were carried out with the aid of regression and correlation analysis.

RESULTS AND DISCUSSION

Results

Field Measurements Along Route A

The tables 3a and 3b show the results of measurements taken along Route A at different locations

Table 3.1a Result of Measurement of Route A From EKTV Base station.

Observation	Line of Sight from EKTV Base (km)	Latitude (Degrees)	Longitude (Degrees)	Elevation (AGL) (m)	Field Strength E(dBμV)	Location
1	0.00	7.8019	5.45972	373	93.5	Base
2	2.44	7.93306	5.42833	399	64	Eksu Gate
3	5.31	7.79056	5.38833	408	47.5	Eksu 2
4	6.56	7.97556	5.41861	427	48.5	Iworoko
5	11.39	7.94028	5.45639	569	39.5	Ifaki Ekiti
6	12.61	7.86083	5.39361	556	37.5	Ifaki Ekiti
7	14.11	7.95500	5.41556	543	33	Ayegbaju
8	16.64	7.82833	5.48222	550	45.5	Oye
9	18.48	7.98472	5.53361	618	48.5	Ilupeju
10	21.80	7.99667	5.53361	611	36.5	Itapa
11	23.14	7.84417	5.60028	519	15	Osin
12	31.35	7.86722	5.54972	565	33.5	Ikole
13	31.93	7.91194	5.69833	563	31.5	Ikole

Table 3.1b Result of Measurement of Route A From Star-times Base station

Observation	Line Of Sight From EKTV Base (Km)	Latitude (Degrees)	Longitude (Degrees)	Elevation (AGL)(m)	Field Strength E (dBμV)	Location
1	0.00	7.86528	5.35889	478	66	Base
2	5.63	7.85611	5.44111	415	54	Fajuyi
3	11.88	7.89222	5.42528	414	44	Eksu
4	13.28	7.95389	5.42556	436	41.5	Iworoko
5	12.61	7.86083	5.39361	556	38.5	Ifaki Ekiti
6	18.47	7.95389	5.46361	578	31.5	Ifaki Ekiti
7	21.11	7.94194	5.50028	552	33	Ayegbaju
8	23.82	7.82917	5.52694	557	42.5	Oye
9	25.94	7.98222	5.52694	622	20.5	Ilupeju
10	29.38	7.98861	5.44306	609	26	Itapa
11	30.59	7.84222	5.59694	523	18.5	Osin
12	38.18	7.81194	5.68722	549	15.5	Ikole

Field Measurements Along Route B

Table 3.2a below show the results of measurements taken along Route B at different locations

Table 3.2a: Result of Measurement of Route B From EKTV Base station.

Observation	Line Of Sight from EKTV Base (km)	Latitude (Degrees)	Longitude (Degrees)	Elevation AGL(m)	Field Strength E (dBμV)	Location
1	0.00	7.8019	5.45972	373	935	Base
2	3.96	7.76472	5.33472	425	68.5	School Of Nursing
3	5.14	7.70889	5.25333	430	76.0	Similoluwa
4	6.49	7.76250	5.44250	420	75.5	Pavilon (Iyin Road)
5	9.45	7.80389	5.36167	564	41.0	Iytn Ekiti
6	13.24	7.68833	5.28999	575	34.5	Igede Ekiti
7	21.94	7.78444	5.05778	450	27.5	Aramoko
8	24.38	7.92139	5.27111	349	24	Aramoko
9	26.92	7.74444	5.09166	550	34.5	Erio Ekiti
10	34.42	7.96389	5. 10000	429	34.5	Ido Ile Junction
11	34.58	7.74556	4.95556	444	23.5	Efon Valley
12	35.88	7.71583	4.96722	535	27.5	Efon Peak

Table 3.2b Result of Measurement of Route B From Star-times Base station

Observation	Line Of Sight from EKTV Base (Km)	Latitude (Degrees)	Longitude (Degrees)	Elevation AGL (m)	Field Strength E (dBμV)	Location
1	0.00	7.86528	5.35889	478	66	Base
2	6.49	7.76250	5.44250	420	45	Pavilion (Iyin Road)
5	9.45	7.80389	5.36167	564	29	Iyin Ekiti
6	13.24	7.68833	5.28999	575	21.0	Igede Ekiti
7	21.94	7.78444	5.05778	450	18	Aramoko
8	24.38	7.92139	5.27111	349	21.5	Aramoko
9	26.92	7.74444	5.09166	550	20	Erio Ekiti
9	34.58	7.74556	4.95556	444	20.5	Efon Valley
10	35.88	7.71583	4.96722	535	10.5	Efon Peak

Discussion

Along route A

Table 3.3(a) demonstrates that the Line of Sight and Elevation along Route A have a strong significant positive correlation (0.7594). This indicates that when Line of Sight rises, so does elevation. The Line of Sight and Signal Strength have a considerable negative connection. This means that as the Line-of-Sight increases, the signal strength reduces along the path. There is also a moderate negative significant relationship between Elevation and Signal Strength indicating that increase in Elevation reduces the Signal Strength along the route.

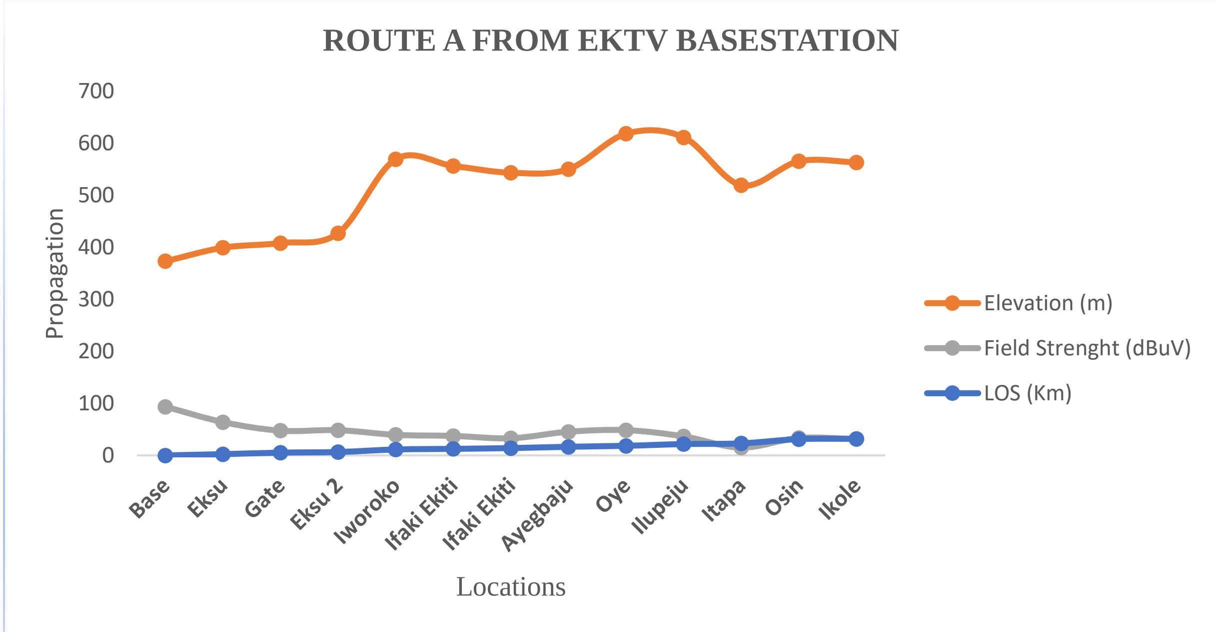

Fig 2 (a): Elevation, Line of Sight and Signal Strength of Route A from EKTV Base

Table 3.3(a) Correlation Matrix for Route A from EKTV

	LOS (km)	Elevation (m)	Signal Strength
LOS (km)	**1**	0.7594	-0.7275
Elevation (m)	**0.7594**	**1**	-0.6550
Signal Strength	**-0.7275**	**-0.6550**	**1**

Table 3.3(b) Regression Table for Route A from EKTV base Station

	Coefficients	P-Value	R^2	Regression significance
Intercept	87.332	0.019887	0.554	0.0176
LOS (km)	-1.0033	0.12482	0.465	0.0176
Elevation (m)	-0.054457	0.47278	0.465	0.0176

Table 3.3(b) of Regression of Signal Strength (RSS) on Line of Sight (LOS) and Elevation (ELV) yields a coefficient of determination (R2) of 0.554. This means that 55.4 changes in signal strength are explained by variations in line of sight and elevation. The overall regression test (Analysis of Variance) reveals a statistically significant regression model since the P-value (0.0176) is less than the predefined threshold of significance (0.05)

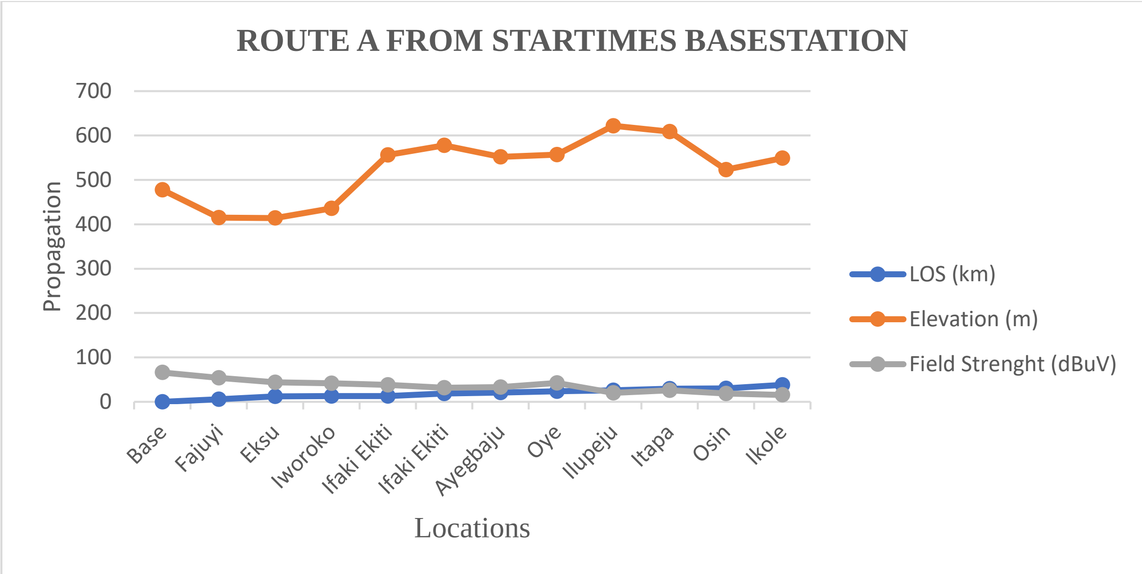

Figure 3.3(b): Elevation, Line of Sight, and Signal Strength for Route A from Star-times Base

Table 3.3(c) Correlation matrix for route A from star times base station

	LOS (km)	**Elevation (m)**	**Signal Strength**
LOS (km)	**1**	0.6417	-0.9298
Elevation (m)	**0.6417**	**1**	-0.6411
Signal Strength	**-0.9298**	**-0.6411**	**1**

The correlation matrix data for route A from Star-times shows a moderately substantial positive correlation (0.6417) between the Line of Sight and Elevation along the route. The Line of Sight and Signal Strength along Route A from Star-times have a highly significant negative association (-0.9298). This means that when the Line of Sight rises throughout the trip, the signal strength decreases proportionately. However, there is a substantially negative connection between Elevation and Signal Strength along the route, meaning that signal strength decreases as elevation increases along the route.

Table 3.3(d) Regression table of route A from Star-times

	Coefficients	P-Value	R^2	Regression significance
Intercept	67.087	0.0015477	0.868	0.000111
LOS (km)	-1.1906	0.00034388	0.838	0.00111
Elevation (m)	-0.015685	0.64402	0.838	0.00111

Regression Table 3.3(d) shows that the total regression model from Star-times is significant since the P-value for ANOVA is smaller than (0.05). Furthermore, the variance in Line of Sight and Elevation throughout the trip account for 86.8% of the variation in Signal Strength. The coefficient of determination (R^2=0.86.8) confirms this.

3.2.2. Along Route B

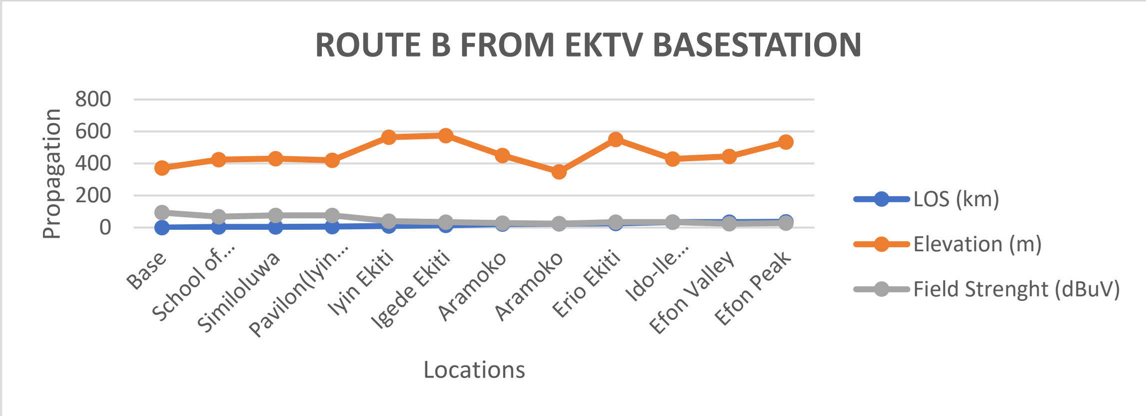

Figure 3.3(c): Elevation, Line of Sight, and Signal Strength for Route B from EKTV Base

Table 3.3(e) Correlation Matrix of Route B from EKTV base station

	LOS (km)	Elevation (m)	Signal Strength
LOS (km)	**1**	**-0.0573**	**-0.8356**
Elevation (m)	**-0.0573**	**1**	**-0.1693**
Signal Strength	**-0.8356**	**-0.1693**	**1**

According to Table 3.3(e), there is a moderate negative correlation (-0.0573) between Line of Sight and Elevation along Route A. The Line of Sight and Signal Strength have a highly substantial negative association. This means that as the Line of Sight increases, the Signal Strength reduces along the path. Elevation and Signal Strength also have a non-significant negative association.

Table 3.3(f): Regression Table of ROUTE B FROM EKTV BASESTATION

	Coefficients	P-Value	R^2	Regression significance
Intercept	73.825	0.020416	0.746	0.0165
LOS (km)	-1.1543	0.0062759	0.661	0.0165
Elevation (m)	-0.048882	0.33141	0.661	0.00111

The coefficient of determination (R^2) is 0.746 in table 4.3(f) of Regression of Signal Strength (RSS) on Line of Sight (LOS) and Elevation (ELV). This means that 74.6 changes in signal strength are accounted jointly by variations in line of sight and elevation. Because the P-value (0.0165) is less than the desired threshold of significance (0.05), the overall regression test (Analysis of Variance) reveals a statistically significant regression model.

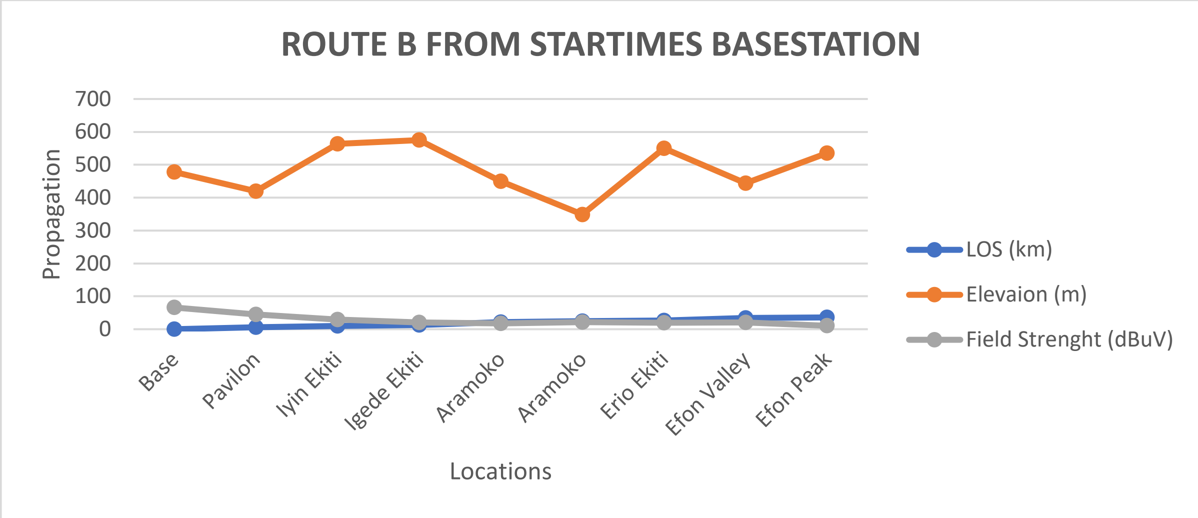

Fig 3.3(d): Elevation, Line of Sight and Signal Strength for Route B from Star-times Base

Table 3.3(g) Correlation Matrix for Route B From Star-times Base station

	LOS (km)	Elevation (m)	Signal Strength
LOS (km)	**1**	**-0.1693**	**-0.0573**
Elevation (m)	**-0.1693**	**1**	**-0.8356**
Signal Strength	**-0.0573**	**-0.8356**	**1**

Table 3.3(g) demonstrates that the Line of Sight and Elevation have a modest negative non-significant negative association (-0.1693) along Route A. This means that when the Line of Sight rises, the height decreases insignificantly. The Line of Sight and Signal Strength have a non-significant negative association. This means that as the Line-of-Sight increases, so does the Signal Strength along the path. There is also a somewhat strong negative significant link between Elevation and Signal Strength, showing that as elevation increases, the signal strength reduces throughout the trip.

Table 3.3(h): Regression Table of Route B From Star-times

	Coefficients	P-Value	R^2	Regression significance
Intercept	73.825	0.020416	0.746	0.0165
LOS (km)	-1.1543	0.0062759	0.661	0.0165
Elevation (m)	-0.048882	0.33141	0.661	0.00111

The coefficient of determination (R2) is 0.746 in table above of Regression of Signal Strength (RSS) on Line of Sight (LOS) and Elevation (ELV). This means that 74.6 changes in signal strength are accounted jointly by variations in line of sight and elevation. Because the P-value (0.0165) is less than the necessary level of significance (= 0.05), the overall regression test (Analysis of Variance) reveals a statistically significant regression model.

Table 3.4(a)Summary Table of Correlation Analysis

ROUTES	Coefficients	P-Value	Regression significance
ROUTE A EKTV	0.7594	-0.655	-0.7275
ROUTE A STARTIMES	0.6417	-0.6411	-0.9298
ROUTE B EKTV	-0.0573	-0.1693	-0.8356
ROUTE B STARTIMES	-0.1693	-0.8356	-0.0573

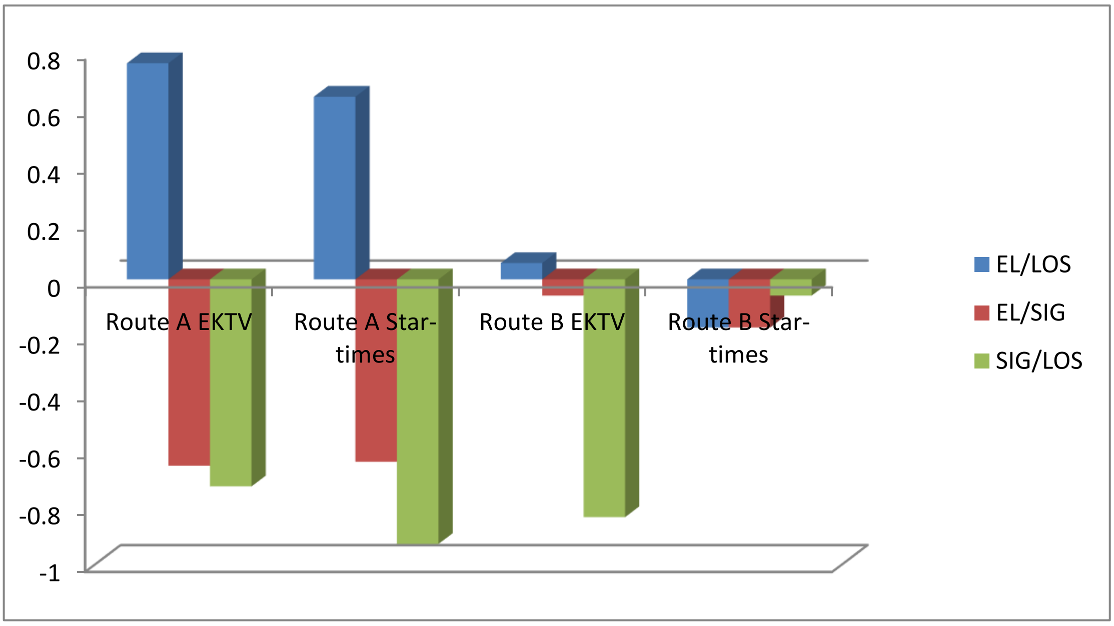

Fig 3.4(a) Chart Relations for Correlation Analysis

Table 3.4(b): Summary Table of Regression Analysis

ROUTES	COD	P VALUE
ROUTE A EKTV	0.554	0.0176
ROUTE A STARTIMES	0.868	0.000111
ROUTE B EKTV	0.746	0.0165
ROUTE B STARTIMES	0.746	0.0165

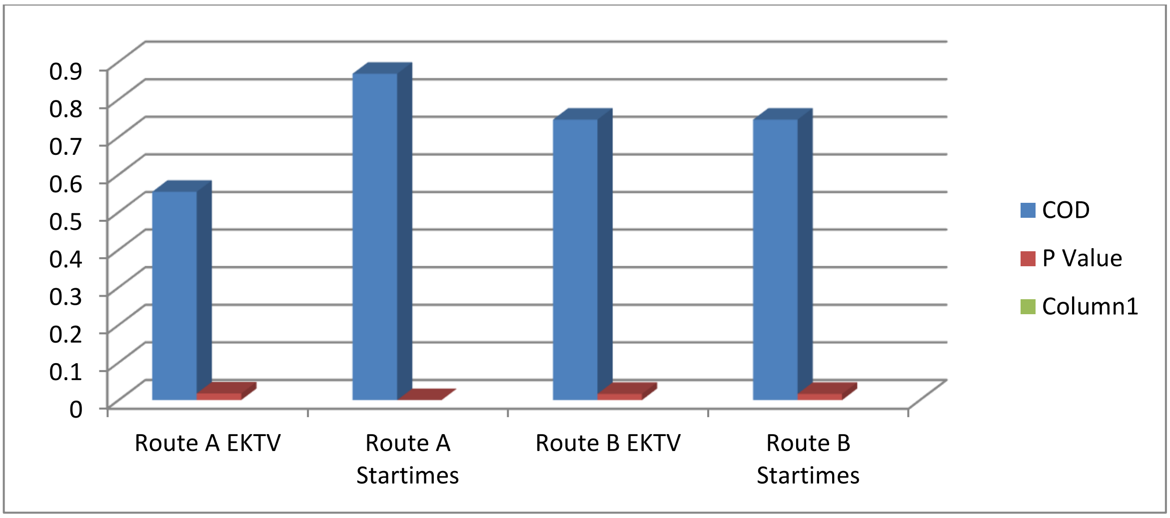

Fig 3.4(b) Chart Relations for Regression Analysis

Ponle *et al*,2019 presents an assessment of the quality of UHF signal reception and development of path loss model in the UHF range for the city of Ado-Ekiti in Nigeria, using the signal field strength of the broadcast signal of Ekiti State Television (EKTV). Measurements of received signal field strength within and around the city were carried out and analyzed, from which path loss models in the UHF range were developed for Ado-Ekiti using linear regression model. The result of the field strength measurements from EKTV in comparison with ITU recommendation for analogue terrestrial television service in band V shows that the quality of reception within Ado-Ekiti metropolis is good. Also, path loss prediction for Ado-Ekiti using three conventional empirical models in literature: Okumura-Hata model, COST-Hata model, and Egli model were performed, and the results obtained were compared with results from the developed models. Comparison shows that COST-Hata model has the highest standard deviation value of 24.11 from the general model while Okumura-Hata and Egli model has lower values of 22.76 and 22.30 respectively. For the model of the western region with irregular terrain, COST-Hata model also has the highest standard deviation value of 26.61 while Okumura-Hata and Egli each has a value of 25.29 and 21.85 respectively. The result shows that COST-Hata model has the highest standard deviation from the developed models while Okumura-Hata and Egli models have lower standard deviation values.

Zubair *et al*, 2021 presents an assessments and evaluation of five widely used empirical path loss models in predicting signal in the VHF and UHF bands in Kano City, Nigeria. In the work five error analysis methods were used. It was found that HATA model provides the best results in terms of minimum mean Error, RMSE and SCRMSE.

Iwuji *et al*,2022 features the investigation of path losses of Nigeria Television Authority (NTA) Channel 6 Aba in Abia State, Nigeria. Path loss values for each route were calculated using received signal strength. The plotting of path loss against distance demonstrated that the path loss increases with distance along each of the routes, further analysis resulted in the development of a path loss model. The accuracy of the model in predicting path loss at the study sites were obtained from the developed model plotted against distance and compared with the measured path loss for the NTA signals. The free space path loss (FSPL) model, which came closer to the developed model and the measured path loss values, was modified to accurately predict NTA Aba path loss values in the study locations. Some statistical tools (RMSE, ME, and SDE) were used to validate the developed model and the modified FSPL.

Akinbolati *et al*, 2018 carried out measurement of the Received Signal Strength (RSS), Elevation (ELV)and Line of Sight (LOS) from a base station (UHF television channel 23 transmitter in Akure, Ondo State, Nigeria using a Signal Level Meter and a Global Positioning System (GPS)receiver respectively. Data collected along the two routes (Ondo North and Ondo South) were analyzed using both Regression and Correlation Analysis

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Mathematical models was derived that can be used to calculate the Received Signal Strength (RSS), for route A and B and for the entire state for given values of Elevation (ELV) and Line of Sight (LOS)

CONCLUSION

This research has generated data for UHF radio wave propagation. From the analysis of field measurements, signal strength decreases with increasing line of sight along all routes for EKTV and star times, with the exception of Route B. Line of Sight and Elevation have a strong negative connection in almost all routes except along route A for star-times. Elevation and Signal strength correlation indicated negatively very high except for along route B for EKTV and route A for Star-times. Regression analysis revealed that variance in Line of Sight and Elevation accounted for high significant changes in signal strength for EKTV and consistent very high changes for Star-times. According to the findings, the distance between the transmitter and the receiver is a significant factor of signal attenuation. Transmitter power, signal type (Digital/Analog), topography/elevation, precipitation elements, and meteorological parameters of the atmosphere all have an impact on terrestrial signal broadcasting.

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