

GLOBALCOM GSM SIGNAL STRENGTH VARIATION IN THE LOCAL GOVERNMENT HEADQUARTERS OF AKWA IBOM STATE, NIGERIA



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ABSTRACT

A study on the Globacom GSM signal strength has been carried out in the thirty-one Local Government Headquarters (LGH) of Akwa Ibom State (AKS) Nigeria. The study was carried out from 2009 to 2013. The study used the GSM signal phone meter with a Glo SIM card inserted, to measure the signal strength ranging from zero (0) to one hundred (100%). The etrex HC series Global Positioning System (GPS) was used in noting the locations in both latitude and longitude. The locations have been further divided into senatorial districts of AKS. In Uyo Senatorial District, apart from the occurrence of 55% in Idu Uruan, all the other LGHs recorded 100%. In Eket Senatorial District, Ukwo, Abat and Oyubia recorded very low occurrences in percentage with Oyubia showing a no signal occurrence. Only Ikot Akpan Nkuk recorded a nil occurrence in Ikot Ekpene Senatorial District. The high performance of the Glo network in these locations can be attributed to the efficient boosting strength of the signals at the LGHs being the seats of government. The nil occurrences in Ikot Akpan Nkuk and in Oyubia require an immediate attention by the network providers.

INTRODUCTION

A telephone converts sound into electronic signals suitable for transmission via cables or other transmission media over long distances and replays such signals simultaneously in audible form to its users. Recent deregulation of the mobile phone market has led to the introduction of the Global System for Mobile Communication (GSM). Network providers operate on the 900/1800 Mhz spectrum. In 2011, the number of users of mobile phones in Nigeria was put at 88 million; with most people having more than one cell phone (Tainter, 2012; Cheesman, 1991; Crook and Müllelr, 2010).

One of the major challenges that some GSM subscribers in Nigeria specifically Akwa Ibom State have is lack of good quality or no GSM signal occurrence available for them on their phones in various locations. This poor quality or no GSM signal may occur as a result of certain factors, which may include: high buildings, tall trees, mountains, hills, no GSM mast or antenna. These factors reduce or cause a negative effect on the GSM signal; (Umoh *et al* 2013; Dodd, 2002, Kostas, 2005; Hall and Barclay, 1989). In Local Government Headquarters, GSM signals would normally be expected to be strong, but there are still some with very weak or no signals at all. There is also the problem of signal fluctuations at locations where signals are usually strong; (Zept and Rufa, 1994).

MATERIALS AND METHOD

The data were acquired by using the GSM signal phone meter with a Glo SIM card inserted into the phone. The locations were measured by the GPS spanning latitudes $4^{\circ}33'$ to $5^{\circ}34'$ North and longitudes $7^{\circ}35'$ to $8^{\circ}25'$ East. As the length and breadth of Local Government Headquarters were traversed, the phone meter was monitored for fluctuations of signal from zero to 100%. Percentages of zero to forty are regarded as weak signals. A very strong signal could have an average strength of 80% and above. The data obtained were analyzed and the occurrence patterns shown in Figures 1, 2, and 3.

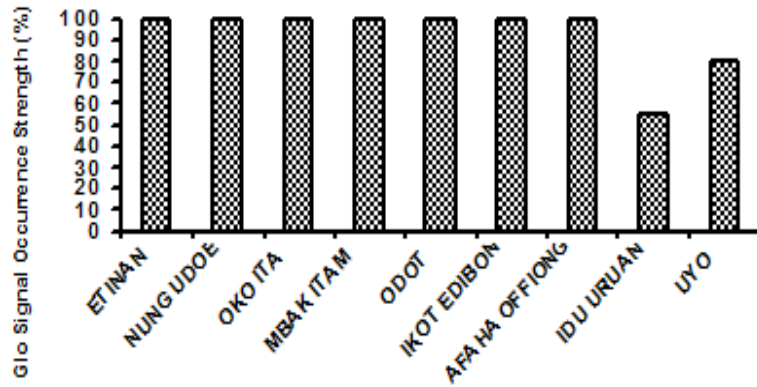


Fig. 1: Uyo Senatorial District: LGA Headquarters

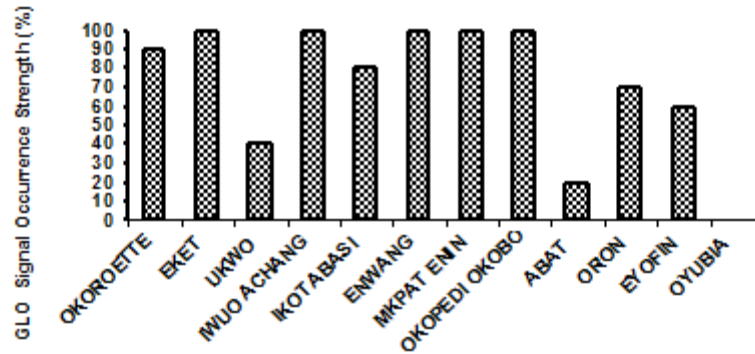


Fig. 2: Eket Senatorial District: LGA Headquarter

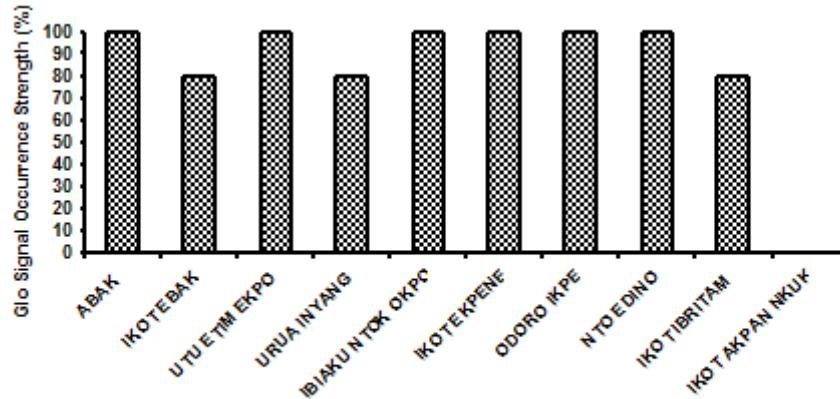


Fig.3: Ikot Ekpene Senatorial District: LGA Headquarters

RESULTS

The results are also shown in Tables 1, 2 and 3 respectively. The signal strength in Uyo Senatorial District is very strong apart from that of Idu Uruan, the headquarter of Uruan LGA, which recorded 55%. The variations in Eket Senatorial District, Fig. 2 fluctuates from 0% in Oyubia, 20% in Abat to 100% in Eket, Iwuo Achang, etc. The occurrence in Ikot Ekpene Senatorial District had a better performance than that of Eket. Apart from Ikot Akpan Nkuk, the headquarter of Ukanafun which recorded nil occurrence (0%), a minimum of 80% occurrence was recorded in the other headquarters, giving an indication of a very strong signal occurrence, (Fig. 3).

Table 1: Uyo Senatorial District

S/N	L.G.A	Headquarter	Glo (%)
1	Etinan	Etinan	100
2	Ibesikpo Asutan	Nung Udoe	100
3	Ibiono Ibom	Oko Ita	100
4	Itu	Mbak Itam	100
5	Nsit Atai	Odot	100
6	Nsit Ubium	Ikot Edibon	100
7	Nsit Ibom	Afaha Offiong	100
8	Uruan	Idu Uruan	55
9	Uyo	Uyo	80

Table 2: Eket Senatorial District

S/N	L.G.A	Headquarter	Glo (%)
1	Eastern Obolo	Okoroette	90
2	Eket	Eket	100
3	Esit Eket	Ukwo	40
4	Ibeno	Iwuo Achang	100
5	Ikot Abasi	Ikot Abasi	80
6	Mbo	Enwang	100
7	Mkpat Enin	Mkpat Enin	100
8	Okobo	Okopedi Okobo	100
9	Onna	Abat	20
10	Oron	Oron	70
11	Udung Uko	Eyofin	60
12	Urue Offong/Oruko	Oyubia	0

Table 3: Ikot Ekpene Senatorial District

S/N	L.G.A	Headquarter	Glo (%)
1	Abak	Abak	100
2	Essien Udim	Ikot Ebak	80
3	Etim Ekpo	Utu Etim Ekpo	100
4	Ika	Urua Inyang	80
5	Ikono	Ibiaku Ntok Okpo	100
6	Ikot Ekpene	Ikot Ekpene	100
7	Ini	Odoro Ikpe	100
8	Obot Akara	Nto Edino	100
9	Oruk Anam	Ikot Ibritam	80
10	Ukanafun	Ikot Akpan Nkuk	0

A further study aimed at mapping the Glo GSM Signal occurrence in Akwa Ibom State is being undertaken. The preliminary results for Akwa Ibom North-West (Ikot Ekpene Senatorial District) is hereby presented. Ikot Ekpene Senatorial District comprises 10 LGAs (Table 3) The signal occurrence patterns are not different from those earlier presented for Local Government Headquarters in Akwa Ibom State. The signal strengths still varied from 0% with no network to 100% with full networks in many locations (Tables 4 to 7 and Figures 4 to 7). The average behaviours as shown in Table 8 and Figure 8 are 86.0% for Ikot Ekpene, 83.3% for Abak, 76.3% for Ini, 52.5% for Ika, 47.9% for Etim Ekpo, 42.5% for Essien Udim, 41.3% for Oruk Anam, 61.7% for Obot Akara, and 35.0% for Ukanafun.

Many locations recorded 100% in Ikot Ekpene, Abak, Ini, Obot Akara, etc. There were also no network in Edem Iyere in Ikono LGA, Ekpenyong Atai and Obo Annang in Essien Udim, Nto Ndang and Ikwen in Obot Akara LGA recorded very low network values in Glo signal.

Table 4: Glo Signal Strength (%) In Ikot Ekpene L.G.A

S/N	Location	Longitude	Latitude	Glo (%)
1	Ikot Ekpene Lga Headquarters	E007 ⁰ 42.698 ¹	N05 ⁰ 10.745 ¹	100
2	State College	E007 ⁰ 43.068 ¹	N05 ⁰ 09.755 ¹	90
3	Utu Edem Usung	E007 ⁰ 43.015	N05 ⁰ 08.772 ¹	100
4	Ukana Ikot Ntuen	E007 ⁰ 42.902 ¹	N05 ⁰ 08.242 ¹	100
5	Ukana Iba	E007 ⁰ 43.905 ¹	N05 ⁰ 07.245 ¹	75
6	Utu-Ikot Ekpenyong	E007 ⁰ 44.708 ¹	N05 ⁰ 09.402 ¹	100
7	Ibiakpan Junction	E007 ⁰ 44.338 ¹	N05 ⁰ 09.621 ¹	100
8	93 Uyo Road	E007 ⁰ 43.883 ¹	N05 ⁰ 09.875 ¹	100
9	Food Affairs	E007 ⁰ 43.012 ¹	N05 ⁰ 10.436 ¹	35
10	Motor Park/Plaza	E007 ⁰ 42.803 ¹	N05 ⁰ 10.744 ¹	65
11	Holy Child School, Aba Road, Ifulao	E007 ⁰ 41.785 ¹	N05 ⁰ 10.935 ¹	100
12	Ikot Akpanabim, Aba Road	E007 ⁰ 40.830 ¹	N05 ⁰ 10.222 ¹	100
13	Ikot Osurua	E007 ⁰ 40.004 ¹	N05 ⁰ 09.625 ¹	100
14	Cardinal Ekadem	E007 ⁰ 41.981 ¹	N05 ⁰ 10.799 ¹	100
15	Abak Road	E007 ⁰ 42.966 ¹	N05 ⁰ 10.124 ¹	100
16	Umuhia Road, Ritman Junction	E007 ⁰ 42.169 ¹	N05 ⁰ 11.768 ¹	100
17	Abak Ifia	E007 ⁰ 41.207 ¹	N05 ⁰ 13.463 ¹	85
18	Ikot – Obong Otoro	E007 ⁰ 40.708 ¹	N05 ⁰ 14.215 ¹	0
19	Ikono Road	E007 ⁰ 42.614 ¹	N05 ⁰ 11.615 ¹	100
20	Ikot Abia Idem, Umuhia Road	E007 ⁰ 41.707 ¹	N05 ⁰ 12.632 ¹	70

Table 5: Glo Signal Strength (%) In Obot Akara L.G.A

S/N	Location	Longitude	Latitude	Glo (%)
1	Judiciary	E007 ⁰ 39.382 ¹	N05 ⁰ 16.326 ¹	0
2	Nto Ndang	E007 ⁰ 38.615 ¹	N05 ⁰ 17.681 ¹	20
3	Utu-Otong	E007 ⁰ 37.727 ¹	N05 ⁰ 19.250 ¹	75
4	Ikwen	E007 ⁰ 37.723 ¹	N05 ⁰ 17.132 ¹	20
5	St Columbant (Ikwen)	E007 ⁰ 37.172 ¹	N05 ⁰ 16.812 ¹	40
6	Abiakpo Nkae	E007 ⁰ 36.634 ¹	N05 ⁰ 16.667 ¹	100
7	Ikot Ukana	E007 ⁰ 36.270 ¹	N05 ⁰ 16.711 ¹	100
8	Mini Residential (Obong Ukru)	E007 ⁰ 35.203 ¹	N05 ⁰ 16.020 ¹	100
9	L.G.A Sert	E007 ⁰ 35.050 ¹	N05 ⁰ 15.326 ¹	100

Table 6: Glo Signal Strength (%) In Ikono L.G.A

S/N	Location	Longitude	Latitude	Glo(%)
1	Ikono Road	E007 ⁰ 42.565 ¹	N05 ⁰ 11.382 ¹	100
2	Ikono Road, Mbiafun Nkwongo	E007 ⁰ 43.466 ¹	N05 ⁰ 13.969 ¹	40
3	Nung Ukim, Ikot Etefia	E007 ⁰ 43.461 ¹	N05 ⁰ 15.214 ¹	100
4	Nung Ukim, Ikono	E007 ⁰ 43.379 ¹	N05 ⁰ 16.224 ¹	60
5	Ibiaku Ntok Okpo	E007 ⁰ 42.899 ¹	N05 ⁰ 16.875 ¹	100
6	Edem Iyere, Ikono	E007 ⁰ 49.548 ¹	N05 ⁰ 10.844 ¹	0
7	Aka Ekpeme Ibat, Ikono	E007 ⁰ 48.227 ¹	N05 ⁰ 10.318 ¹	0
8	Utu-Ikot Ekpene High Way, Ikono	E007 ⁰ 46.774 ¹	N05 ⁰ 09.970 ¹	20
9	Ikot Odu Junction	E007 ⁰ 46.303 ¹	N05 ⁰ 09.979 ¹	90
10	Ikono High Court	E007 ⁰ 42.399 ¹	N05 ⁰ 18.563 ¹	80
11	Itak Junction	E007 ⁰ 50.468 ¹	N05 ⁰ 06.157 ¹	40
12	Nung Udoe Itak, Ikono	E007 ⁰ 50.436 ¹	N05 ⁰ 06.124 ¹	100
13	Ikot Etok Udo/Ikot Enwa, Ikono	E007 ⁰ 48.374 ¹	N05 ⁰ 06.607 ¹	100

Table 7: Glo Signal Strength (%) In Essien Udim L.G.A

S/N	Location	Longitude	Latitude	Glo (%)
1	Ukana Iba, Essien Udim	E007 ⁰ 43.304 ¹	N05 ⁰ 06.514 ¹	100
2	Police College, Ukana	E007 ⁰ 43.587 ¹	E05 ⁰ 05.741 ¹	50
3	Adiasim, Essien Udim	E007 ⁰ 43.871 ¹	E05 ⁰ 04.937 ¹	20
4	Ikot Akpan Ikpong	E007 ⁰ 44.037 ¹	E05 ⁰ 04.352 ¹	50
5	Alsoudoh Petrol Station	E007 ⁰ 44.236 ¹	E05 ⁰ 03.968 ¹	0
6	Loreto College, Essien Udim	E007 ⁰ 44.413 ¹	E05 ⁰ 03.378 ¹	20
7	Ekpenyong, Atai	E007 ⁰ 41.995 ¹	E04 ⁰ 04.508 ¹	0
8	Obo Anang, Essien Udim	E007 ⁰ 41.995 ¹	E04 ⁰ 05.365 ¹	0
9	Mkpatak, Essien Udim	E007 ⁰ 40.749 ¹	E04 ⁰ 02.771 ¹	10
10	Ikpe Anang Junction	E007 ⁰ 46.495 ¹	E05 ⁰ 07.659 ¹	100
11	Utu-Ikpe, Essien Udim	E007 ⁰ 45.458 ¹	E05 ⁰ 08.855 ¹	80
12	Ukan-West, Essien Udim	E007 ⁰ 39.231 ¹	E05 ⁰ 09.405 ¹	80

Table 8: Ikot Ekpene Senatorial District

S/N	L.G.A	AVERAGE VALUES OF GLO SIGNAL STRENGTH (%)
1	ABAK	83.3
2	ESSIEN UDIM	42.5
3	ETIM EKPO	47.9
4	IKA	52.5
5	IKONO	63.8
6	IKOT EKPENE	86.0
7	INI	76.3
8	OBOT AKARA	61.7
9	ORUK ANAM	41.3
10	UKANAFUN	35.0

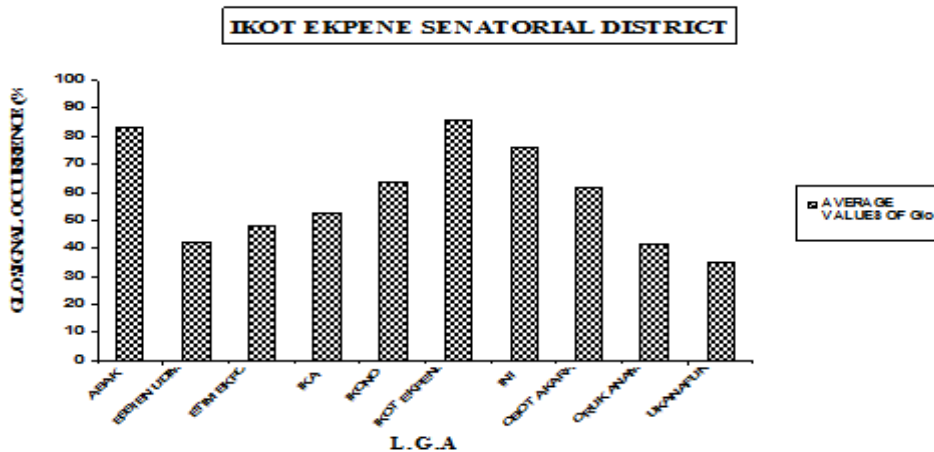


Fig. 8: Average values of Glo Gsm signal strength by LGAs, In Ikot Ekpene Senatorial District

DISCUSSION

Figures 1, 2 and 3 shows the Glo signal strength in each of the thirty-one Local Government Headquarters of Akwa Ibom State. The locations with low or no occurrence in the study include Idu-Uruan, Ukwo, Abat, Eyofin, Oyubia and Ikot Akpan Nkuk. A location like Ikot

Akpan Nkuk suggests a no installation status of the Glo network. The 20% recorded in Abat could have been influenced by its proximity to Eket LGA where mast is located. These locations require urgent attention from Glo network provider. It should be noted that even the locations with 100% signal occurrence sometimes experience fluctuations as low as 30 to 50%, further suggesting a routine turn-around maintenance of the network facilities. The preliminary results from the mapping of Glo network occurrence in Akwa Ibom State is also very revealing on the low prevalence of the network. Work on other areas of Akwa Ibom State is on-going.

CONCLUSION

The study shows that the Local Government Headquarters in Uyo Senatorial District recorded the highest occurrence in Glo network signal. Thus, percentages of up to 80 to 100% were recorded. The occurrence in Ikot Ekpene senatorial district was equally as good as in Uyo, but for the no signal occurrence in Ikot Akpan Nkuk. Local Government Headquarters in Eket Senatorial District require more attention from the Glo network provider, particularly in Oyubia (Urue Offong/Oruko LGA) and in Abat (Onna LGA).

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