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An Evaluation of Outgoing Calls Quality of Gsm Network Services in Oghara, Delta State

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Abstract: This study is aimed at presenting a report on the quality of services provided by GSM operators in a typical village in the southern part of Nigeria. This is expressed in terms of the ability to establish and maintain call connections; intra and inter network calls, for outgoing calls in Oghara, Delta State of Nigeria. Test points within the service area were randomly selected and in each of these locations, series of measurement were made. Three GSM operators were investigated in the area for a period of eleven months and these operators are discussed in this study as Operators A, B and C. The accessibility levels expressed in percentage shows that for intra and inter- network calls, the Operators C network had better call quality of service with an overall assessment of 71.52 and 65.75%, respectively in Oghara for the period investigated.

Key words: Evaluation, outgoing calls, quality, network services, Delta State

INTRODUCTION

The continuing liberalization and technical progress in the telecommunications market means that the providers of mobile radio networks are daily being faced with new challenges. Operators are all competing in the race to gain the lion's share of the growing number of mobile radio users, who naturally require a high quality service. Round-the-clock availability and complete coverage, coupled with acceptable quality at appropriate terms are important factors that are used to differentiate between service providers. Operators are not simply desirous of meeting these needs; user requirements must be met if the aim of customer satisfaction is not to be jeopardized. Further growth is completely dependent on this. The capacity and coverage required must be provided, yet special attention must also be paid to quality.

In this study, we presented an assessment carried out on the call quality of service provided by these operators for outgoing calls; intra and inter network. Emphasis was laid on the call quality, call hold success rate per BTS (for air and Abis interfaces) and the number of call attempted (Adebayo and Edeko, 2005).

MATERIALS AND METHODS

Measurement procedure: Measurements were conducted in Oghara town in the southern part of Nigeria. Use was made of the NOKIA 3310 handsets, each with a SIM card for the existing mobile phone operators. These phones were used for their availability, as well as economic factors. Oghara is a medium sized town that lies within Lat 6°56'00.783"N and Long 5°39'40.537"E. It is characterized with residential buildings and vegetation. The highest building is 2 storeys and all the existing BTS have height higher than the highest roof tops in the town.

The service area was divided by a grid pattern to produce a large number of uniformly sized tiles or test tiles. The entire town was sectioned into 10 test tiles (Kanagulu and Manoj, 1999). In each test tile, a test location was randomly selected. At each of these locations a series of sequential measurement was made. All measurement was taken in the active mode.

Positioned at Oghara at these test locations, calls were made to other mobile users of the same network (intra) and other networks (inter) within and outside the city. At any location a sample number of ten trials of calls were made. The data gathered from this assessment included the number of call attempted and number of call hold success rate for a period of three minutes (Adebayo and Edeko, 2005). The data recorded were averaged daily and then monthly for both intra and inter network connections.

Data collection/analysis: Data were collected throughout the town from August 2006-June 2007. During the period of investigation, a total of a hundred and

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ten thousand calls were made round the town, of which (50%) were for intra network connection and 16.7% from each network for inter network calls. As long as the location system is not providing totally inconsistent results from call to call resulting in large variance, the numbers of calls made were adequate (ATIS Standard, 2004).

Let QSC, Tp, Tt denote call quality for successful calls, average number of call held successfully and total number of call attempted, respectively. The call quality expresses the accessibility level of the networks was computed (Kanagulu and Manoj, 1999):

$$\text{Thus; } \%\,QSC = \frac{T_p}{T_t} \quad (1)$$

Applying Eq. 1 on the data gathered, the accessibility levels in percentage for the period for each network operator were computed.

RESULTS AND DISCUSSION

The average accessibility level charts for intra and inter network calls obtained using Eq. 1 are presented in Table 1 and 2. The generated charts contain information about percentage accessibility level averaged for each month for the respective GSM operators. The results are also presented in graphical form in Fig. 1-4.

From this report, the quality of services provided for the out going call in the Oghara town both for intra and inter network connection is discussed. Table 1 and 2 present the average accessibility level as a function of successful calls for both intra and inter network connections for the period investigated.

Within the period, intra network calls quality seems to decay from 90% in August 2006 to 53% in April 2007 for the C network, from 88.33% in November 2006 to 35% in May 2007 for the B network and from 85% in August 2006 to 45.17% in March 2007 for the A network. While for the inter network calls, the decay was from 90% in August 2006 to 55% in April 2007 for the C network, from 90% in August 2006 to 50% in May 2007 for the B network and from 80.31% in August 2006 and rose to 86.31% in January 2007 and then dropped to 47.67% in March 2007 for the A network, were observed.

The overall assessment was such that the C network had the best performance for the outgoing calls as

Table 1: Intra calls assessment for GSM networks in Oghara, Delta State

Period	Operator (A) (%)	Operator (B) (%)	Operator (C) (%)
August	85.00	81.23	90.00
September	78.33	82.67	88.33
October	75.00	80.50	77.50
November	80.00	88.33	88.00
December	80.00	75.00	77.50
January	85.71	83.56	81.11
February	55.78	50.00	58.67
March	45.17	55.40	55.00
April	53.28	50.63	53.33
May	52.43	35.50	52.78
June	63.75	55.75	64.50
Overall	68.59	67.14	71.52

Table 2: Inter calls assessment for GSM networks in Oghara, Delta State

Period	Operator(a) (%)	Operator (B) (%)	Operator (C) (%)
August	80.31	90.00	90.00
September	79.41	85.58	89.35
October	74.89	88.42	78.00
November	79.83	88.67	84.61
December	71.33	75.00	77.50
January	86.00	85.78	82.44
February	59.33	51.44	60.78
March	47.67	59.20	57.83
April	54.28	58.13	55.50
May	57.86	50.00	61.67
June	64.50	57.00	65.75
Overall	68.67	71.79	73.04

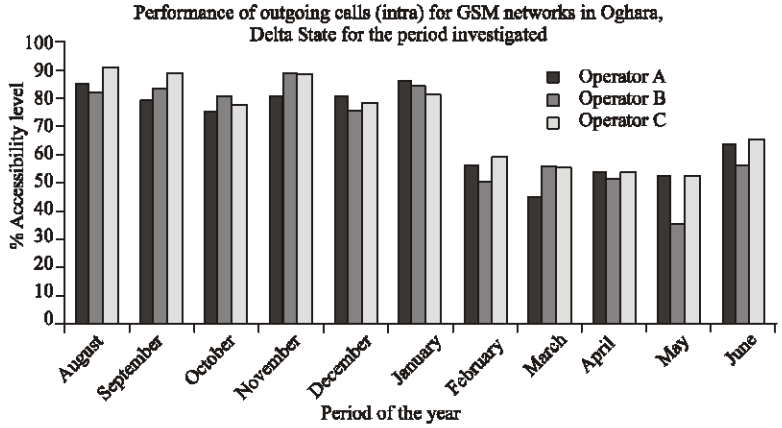

Fig. 1: A bar chart of accessibility level vs period of the year for intra network calls (August 2006-June 2007)

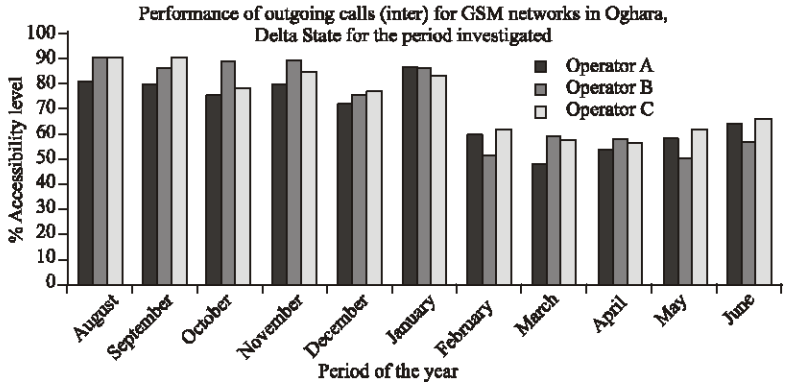

Fig. 2: A bar chart of accessibility level vs period of the year for inter network calls (August 2006-June 2007)

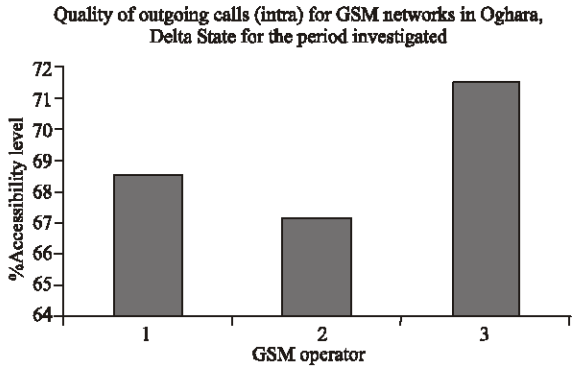

Fig. 3: A bar chart of accessibility level vs GSM operators for intra network calls (August 2006-June 2007)

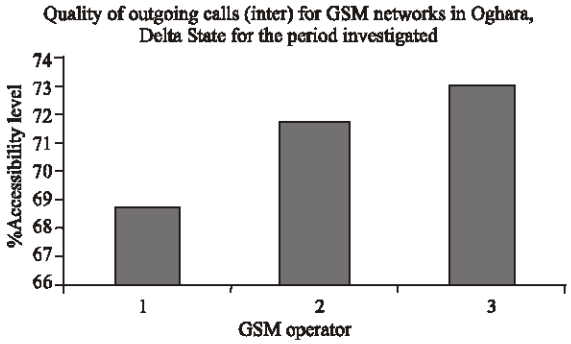

Fig. 4: A bar chart of accessibility level vs GSM operators for inter network calls (August 2006-June 2007)

compared with other networks in the town, with 71.52% for intra network calls connection and 71.04% for inter network calls.

CONCLUSION

The call quality for the outgoing calls was generally good for the first five months (August 2006-January 2007) of this investigation. However the ability to set up and maintain calls between February and May 2007 deteriorated.

From this study, there is need for system optimization in order to improve GSM services in the town.

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