



**Communications
Commission
of Kenya**

**REPORT ON THE CELLULAR MOBILE
NETWORKS' QUALITY OF SERVICE
PERFORMANCE ASSESSMENT FOR THE
2009-2010 YEAR**

REPORT ON THE CELLULAR MOBILE NETWORKS' QUALITY OF SERVICE PERFORMANCE ASSESSMENT FOR THE 2009-2010 YEAR

1. Background

As provided for under section 23 of the KCA, 1998, the Commission is mandated to ensure provision of good quality services by licensed telecommunication operators and service providers. This is further elaborated in the respective licenses under the quality of service condition.

Previously the Commission relied on operators' returns on quality of services performance. It was however noted that the self assessment submissions were not consistent with customer experience who kept complaining about quality of service. In an effort to address the issue, the Commission procured a GSM Quality of Service (QoS) measurement equipment to be able to independently determine the level of compliance by the operators on QoS.

Through a consultative process Key Performance Indicators (KPIs) aimed at ensuring reasonableness, parity and also to ensure progressiveness towards international standards were developed. Subsequently, the mobile operators' licenses were amended to incorporate 8 KPIs on which performance assessment is to be based as shown below.

Table 1: QoS Performance Assessment KPIs

No.	KPI	TARGETS	
		Immediate (From 2009)	After 3 years
1.	Completed Calls	90%	95%
2.	Call Set Up Success Rate (CSSR)	90%	95%
3.	Call Drop Rate	2%	2%
4.	Call Block Rate	10%	5%
5.	Speech Quality	MOS for 95% of samples > 2.7	95% of samples >3.1
6.	Call Set Up Time	13.5 seconds	13.5 seconds
7.	Handover Success Rate	85%	90%
8.	Rx Lev	Outdoor = - 102 dBm	Outdoor = - 102 dBm
		Indoor = -95 dBm	Indoor = -95 dBm
		In car = - 100 dBm	In car = - 100 dBm

The operators are expected to meet the targets of at least 80% (i.e.7 out of 8) of the above KPIs. Over the last period (2009-2010), the commission carried out independent quality of service assessment covering the entire country and the results are as follows.


2. Performance Assessment Results

Table 2 - Overall %age Compliance

LICENSEE	Target Number of QoS parameters for Compliance	%age QoS parameters' Compliance Requirement	No. of QoS Parameters for which targets are Met	Actual %age QoS Parameters' Performance
Safaricom Ltd	8	80%	3	37.5%
Celtel Kenya Ltd	8	80%	7	87.5%
Telkom Kenya Ltd	8	80%	3	37.5%
Essar Telecom (K) Ltd	8	80%	4	50%

Detailed analysis of the operators' individual performance on the specific quality of service parameters are presented below.

In the graphs, the colours/acronyms used have the following meaning:

 - Red - Not Compliant

 - Green - Compliant

 - Blue –License target

N/C - Not Complied

C - Complied

2.1. Individual Operators' Countrywide Performance Assessment Results

The summary of the operators' overall performance arising from the specific quality of service parameters and targets are summarized in the following tables;

Table 3 - Safaricom Limited

No.	QoS Parameter	Targets (%)	Safaricom Performance	Safaricom Compliance Status
1.	Completed Calls	90%	80.08	N/C
2.	Call Set up Success rate	90%	82.64	N/C
3.	Dropped Calls	2%	2.48	N/C
4.	Blocked calls	10%	17.54	N/C
5.	Speech Quality (MOS, PESQ Values)	95% of samples >2.7	92.24	N/C
6.	Handover Success Rate	85%	99.47	C
7.	Call Set up Time	<13.5 Secs	4.80	C
8.	Signal Strength (RxLev-dBm)	Outdoor -102 dBm	-89.9	C

Table 1 - Celtel Kenya Limited

No.	QoS Parameter	Targets (%)	Celtel Performance	Celtel Compliance Status
1.	Completed Calls	90%	87.3	N/C
2.	Call Set up Success rate	90%	90.04	C
3.	Dropped Calls	2%	1.36	C
4.	Blocked calls	10%	9.76	C
5.	Speech Quality (MOS, PESQ Values)	95% of samples >2.7	97.2	C
6.	Handover Success Rate	85%	98.44	C
7.	Call Set up Time	<13.5 Secs	4.788	C
8.	RxLev	Outdoor -102 dBm	-74.4	C

Table 2 - Essar Telecom (K) Limited

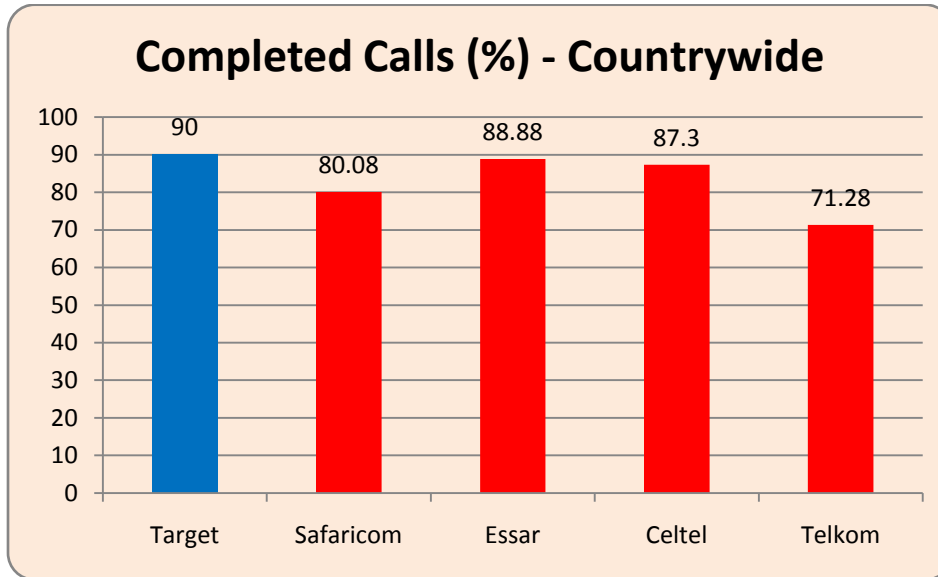
No.	QoS Parameter	Targets (%)	Essar Performance	Essar Compliance Status
1.	Completed Calls	90%	88.88	N/C
2.	Call Set up Success rate	90%	90.9	C
3.	Dropped Calls	2%	2.36	N/C
4.	Blocked calls	10%	8.28	C
5.	Speech Quality (MOS, PESQ Values)	95% of samples >2.7	87.18	N/C
6.	Handover Success Rate	85%	97.56	C
7.	Call Set up Time	<13.5 Secs	19.648	N/C
8.	RxLev	Outdoor -102 dBm	-71.5	C

Table 3 - Telkom Kenya Limited

No.	QoS Parameter	Immediate Targets (%)	Telkom Performance	Telkom's Compliance Status
1.	Completed Calls	90%	71.28	N/C
2.	Call Set up Success rate	90%	73.68	N/C
3.	Dropped Calls	2%	2.92	N/C
4.	Blocked calls	10%	26.04	N/C
5.	Speech Quality (MOS, PESQ Values)	95% of samples >2.7	94.4	N/C
6.	Handover Success Rate	85%	97.74	C
7.	Call Set up Time	<13.5 Secs	4.906	C
8.	Signal Strength (RxLev-dBm)	Outdoor -102 dBm	-76.8	C

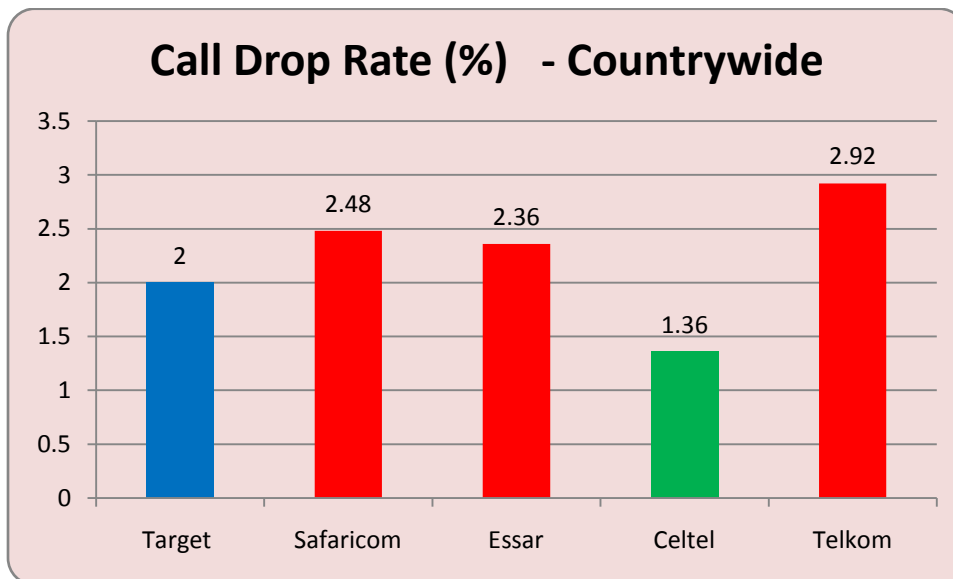
2.2. Operators' Countrywide Comparative Performance Per QoS Parameter

Figure 1



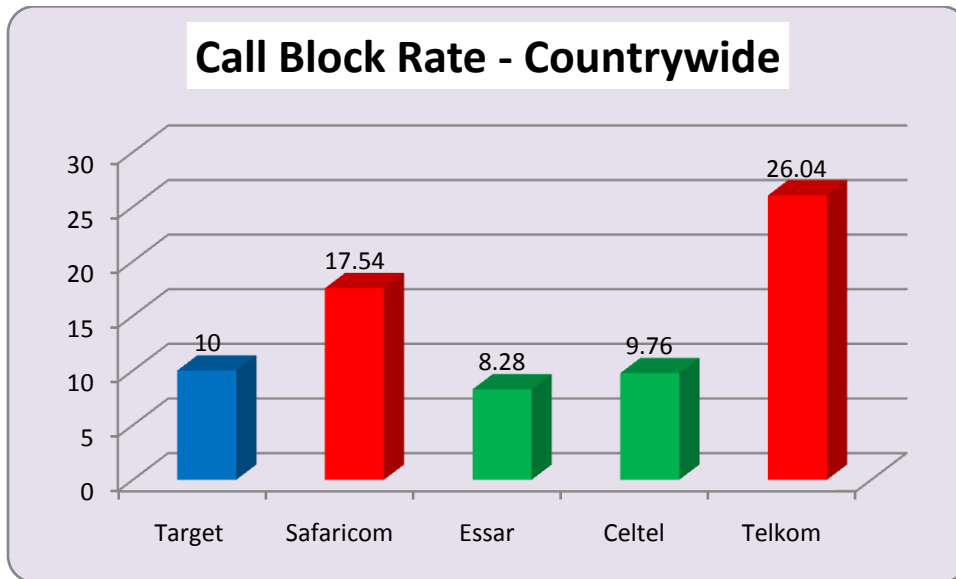
The overall performance results, as depicted in the above graph shows that all the mobile network operators failed to meet the target - 90%, for **Completed Calls**.

Figure 2



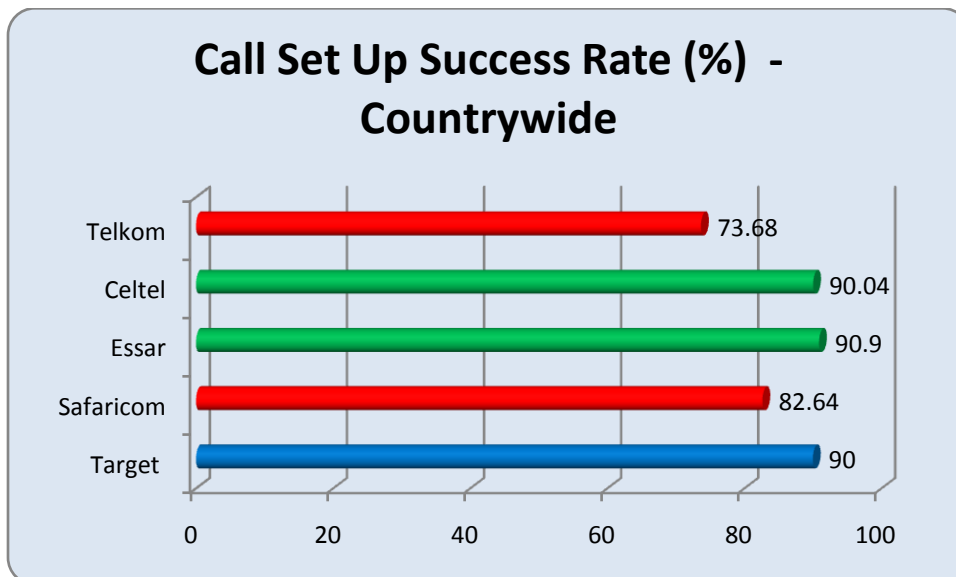
It is also seen that 3 operators also failed to meet the Call Drop Rate – 2% target and only one operator managed to meet the target.

Figure 3



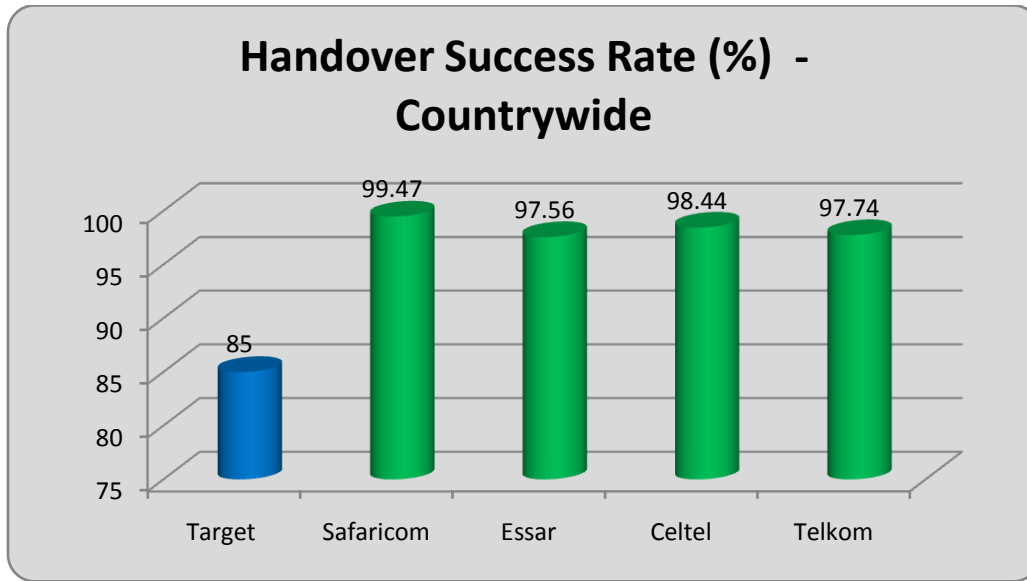
For Call block Rate, only Essar and Celtel managed to meet the target while the other two operators, Safaricom and Telkom failed to meet the targets.

Figure 4



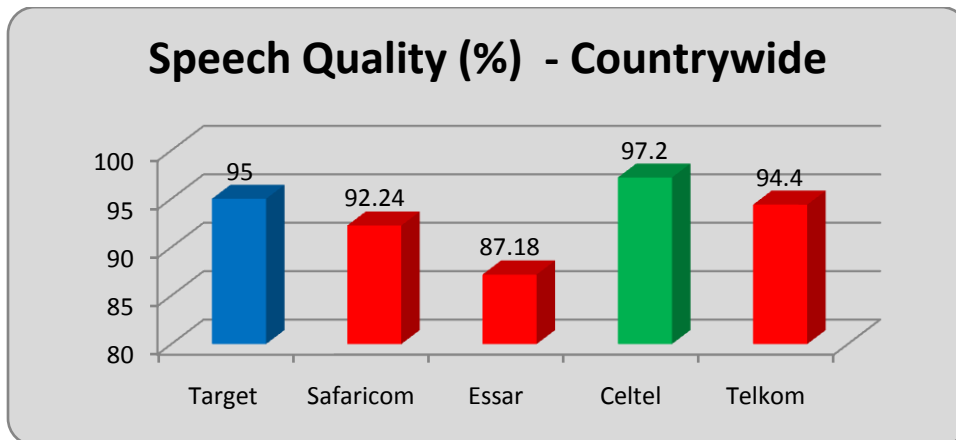
Telkom and Safaricom had the poorest Call Set Up Success Rate performance. However it was noted that although Celtel and Essar met the target, the margin was very small.

Figure 5



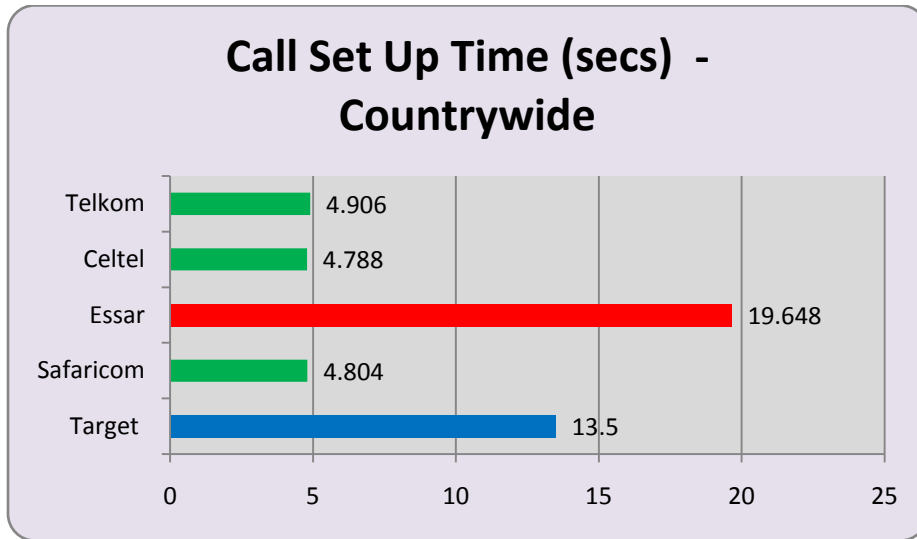
Handover Success Rate is the Quality of service parameter that all the operators have managed to comply with both from individual regions and also countrywide.

Figure 6



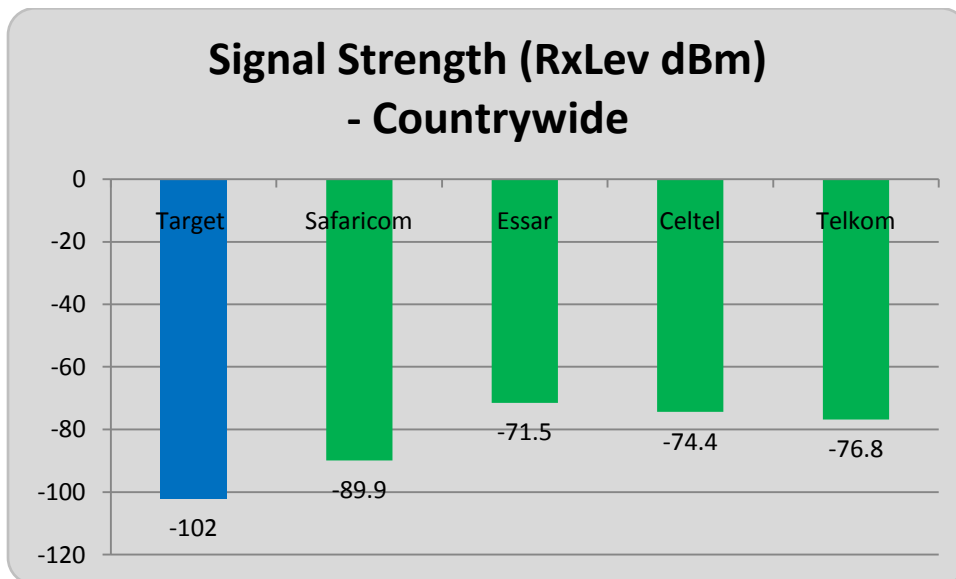
For the speech quality, only Celtel was found to meet the target while the rest of the operators failed to meet the target.

Figure 7



Call Set Up Time results have been derived from Mobile to Fixed line (MOC) set up time only. Whereas all the operators met the call set up time target, ESSAR network experienced long call set up time averaging 19 seconds. Notably for Essar, no specific region registered Call Set up Time Lower than 18 seconds.

Figure 8

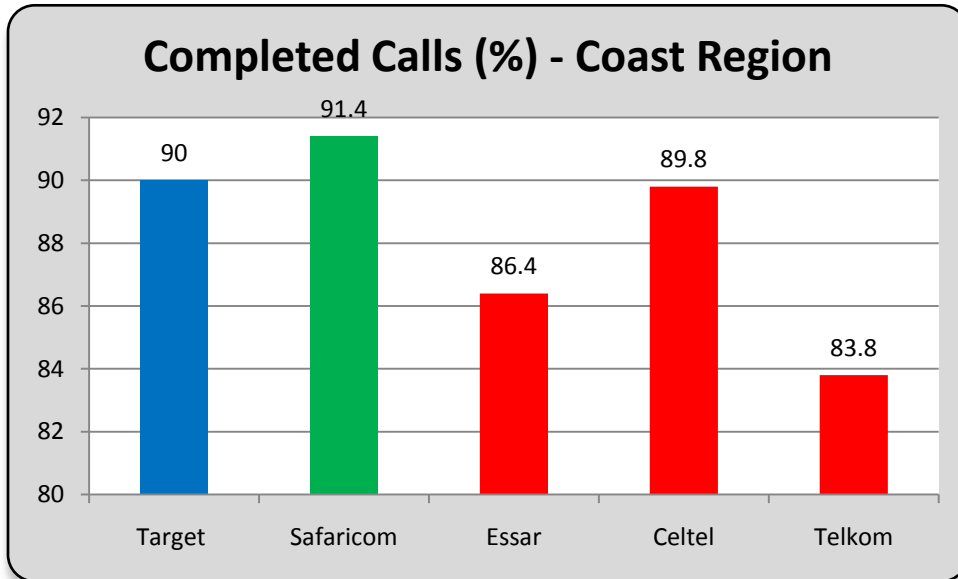


All the mobile operators met the signal strength target in all the regions.

2.3. Operators' Regional Comparative Performance Per Parameter

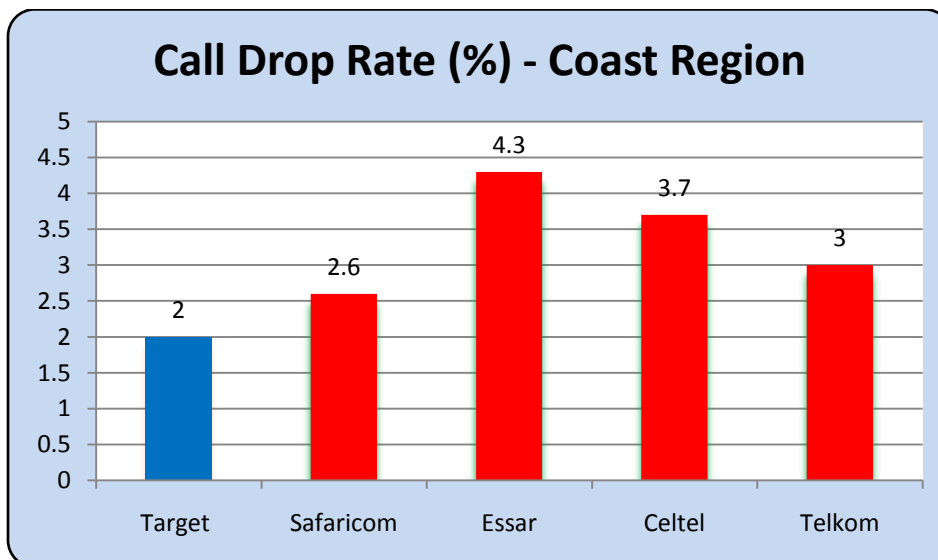
a) Coast Region

Figure 9



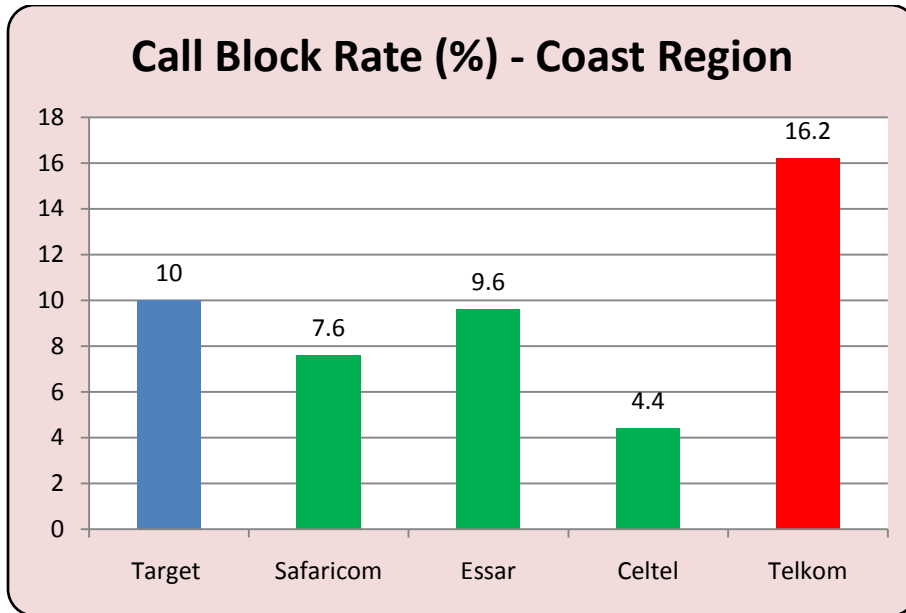
Coast region registered poor performance from Essar, Celtel and Telkom on Completed Calls with only Safaricom meeting the target.

Figure 10



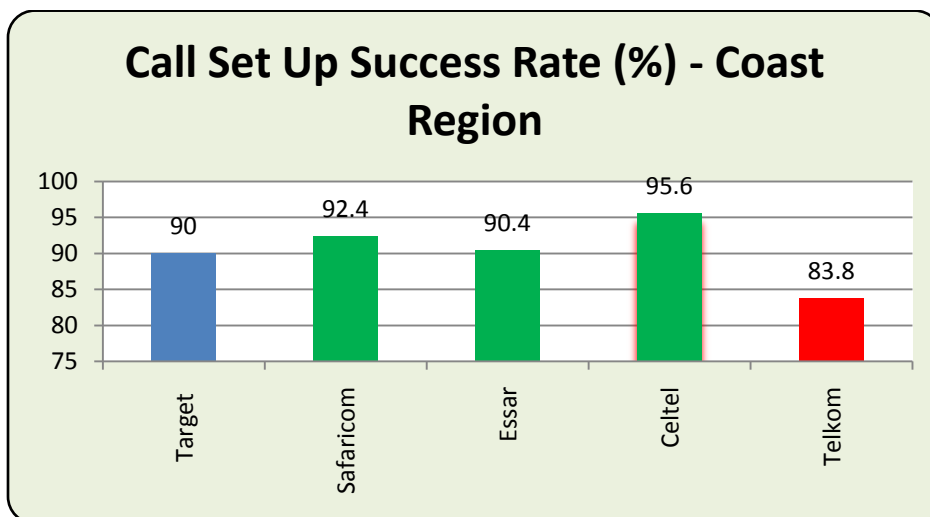
On Call Drop Rate, Coast region saw the poorest performance from all the four operators with Essar registering the highest Call Drop Rate.

Figure 11



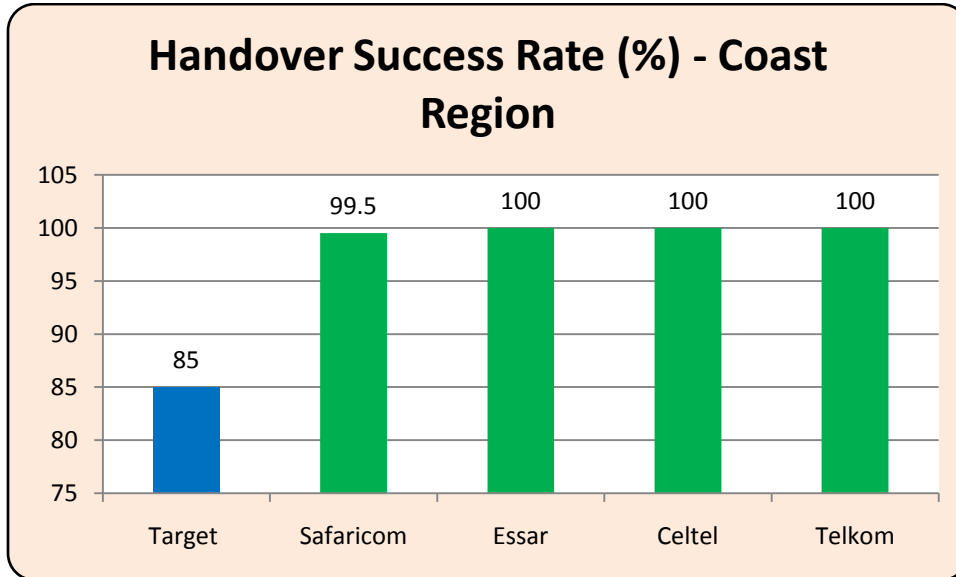
Telkom performed poorly on Call Block Rate in Coast Region while the three other operators met the Call Block Rate target. The situation for Telkom means that for every 100 call attempted, there will be more than 16 that will fail to go through.

Figure 12



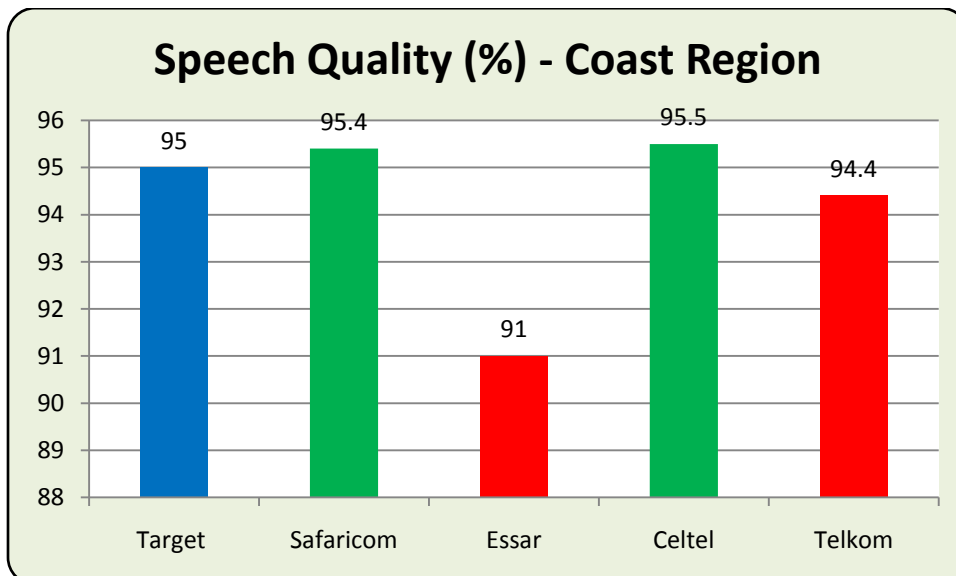
Just as witnessed in Call Block Rate, Telkom also performed poorly on Call Set Up Success Rate while other three operators performed well on this parameter in Coast region.

Figure 13



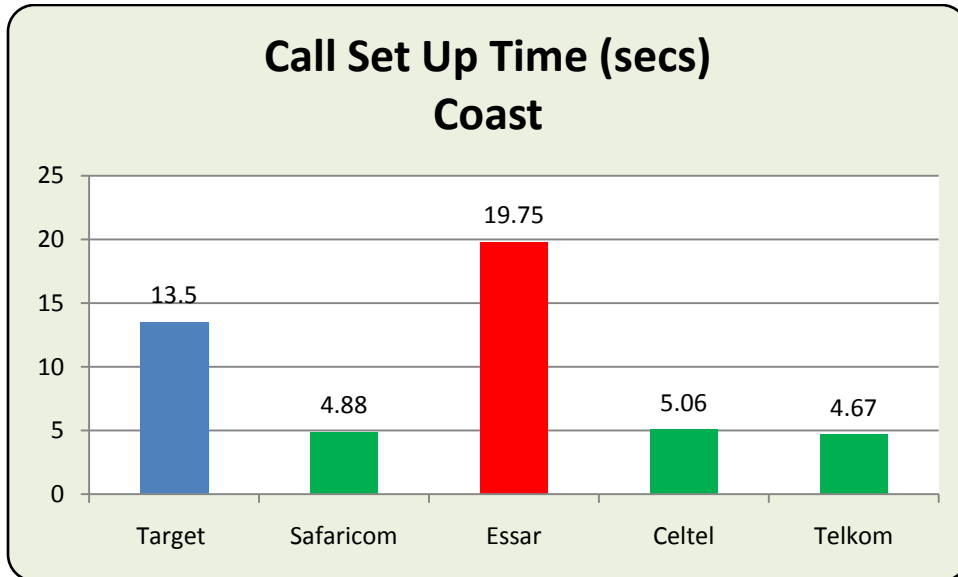
All the operators have recorded impressive performance on Handover Success Rate in Coast Region.

Figure 14



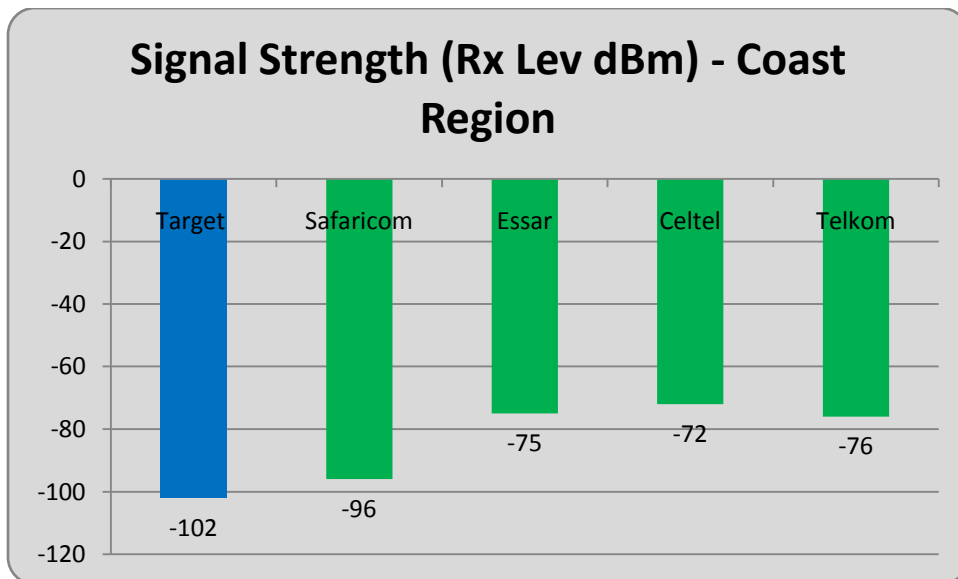
In Coast, Safaricom and Celtel met the Speech Quality performance target while Essar and Telkom failed to achieve their targets.

Figure 15



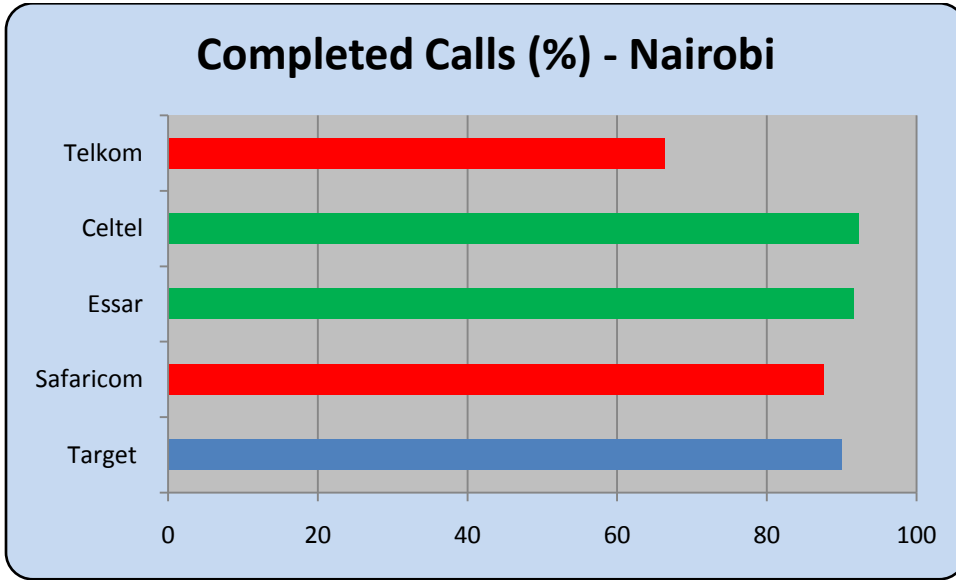
Essar’s performance on Call Set Up Success Rate is far below the target

Figure 16



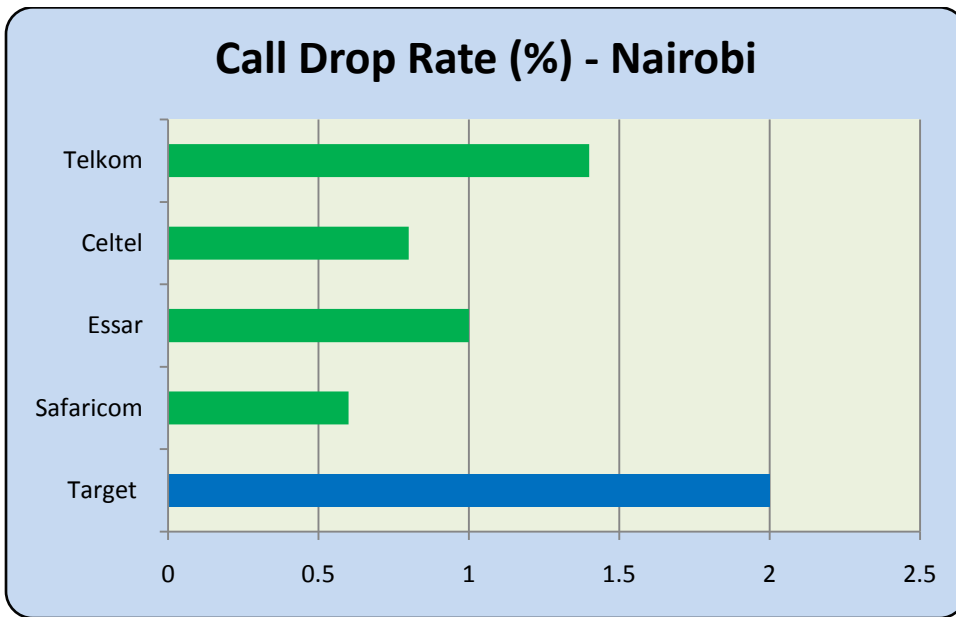
b) Nairobi Region

Figure 17



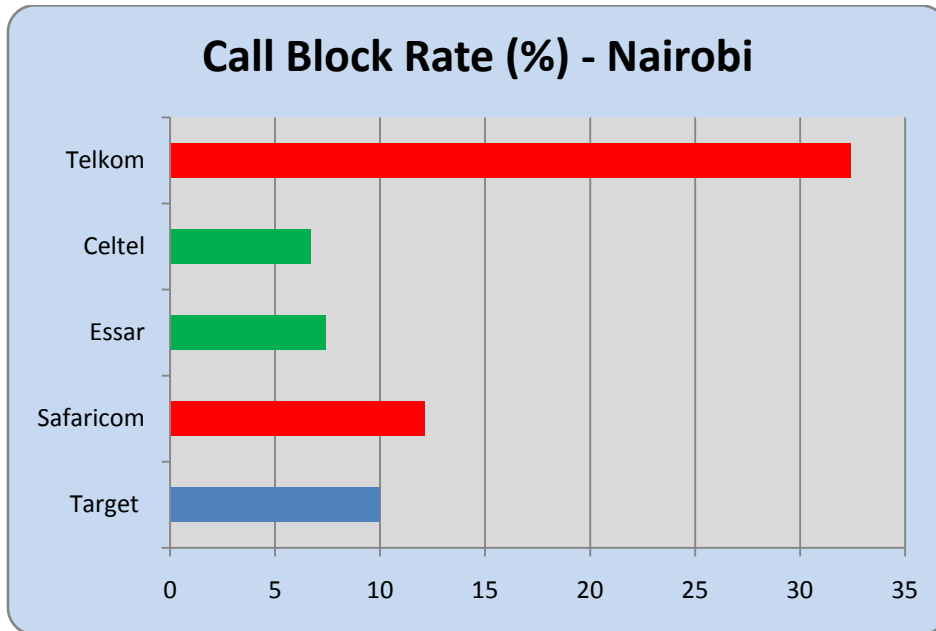
Essar and Celtel complied with Completed Calls in Nairobi but Safaricom and Telkom failed to meet the target.

Figure 18



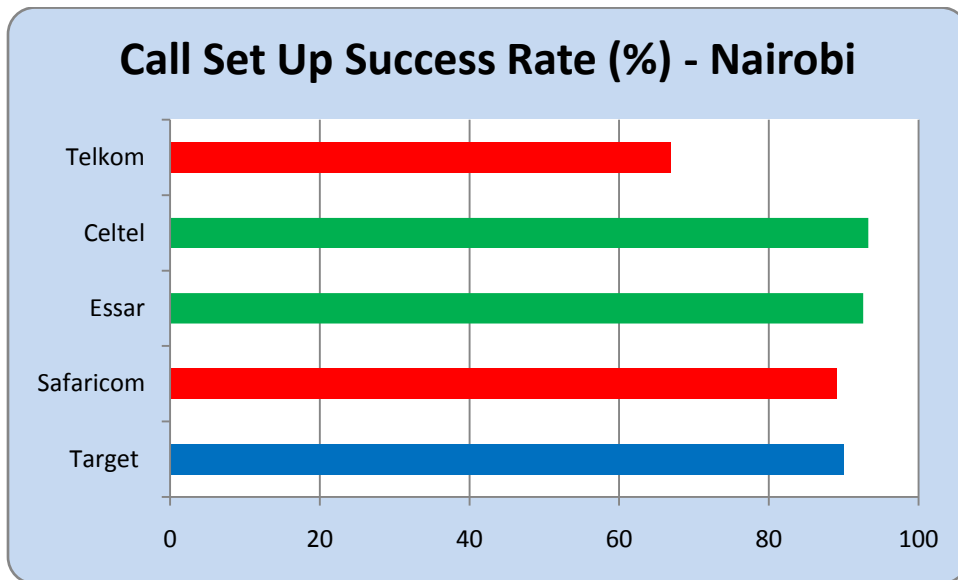
For Call Drop Rate in Nairobi, all the operators were compliant

Figure 19



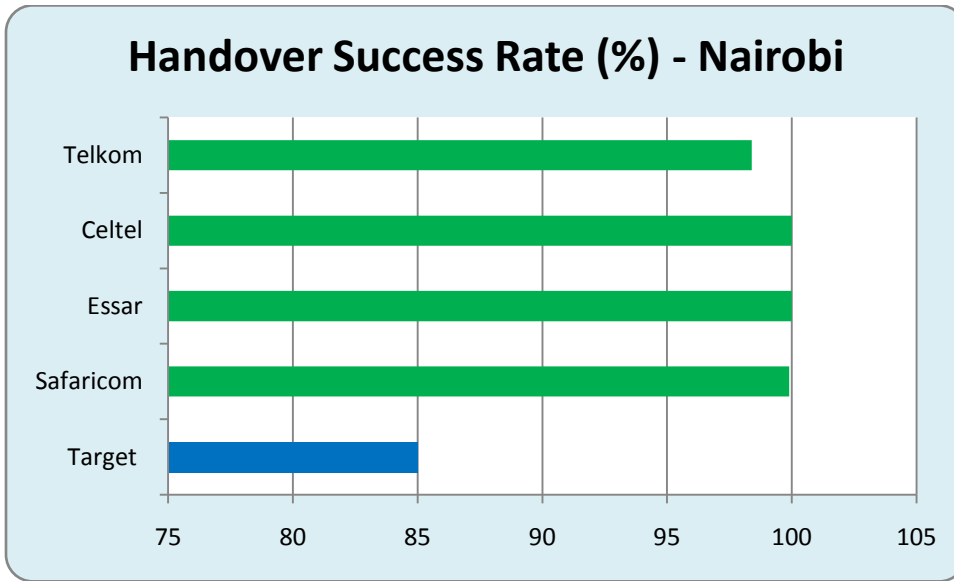
Again on Call Block Rate, Safaricom and Telkom failed to meet their respective targets in Nairobi while Celtel and Essar met their targets.

Figure 20



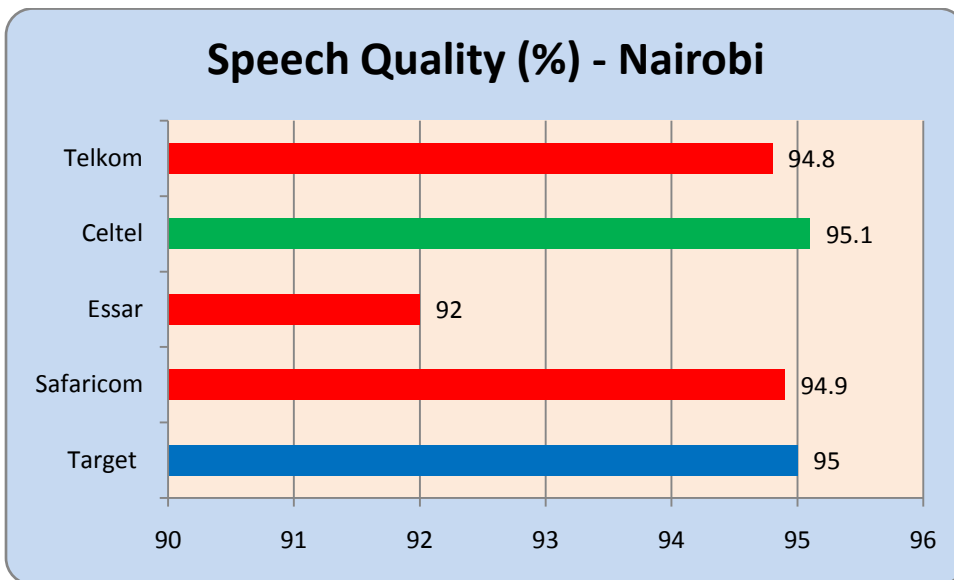
Still on Call Set Up Success Rate in Nairobi, Safaricom and Telkom failed to meet their targets while Celtel and Essar met their targets.

Figure 21



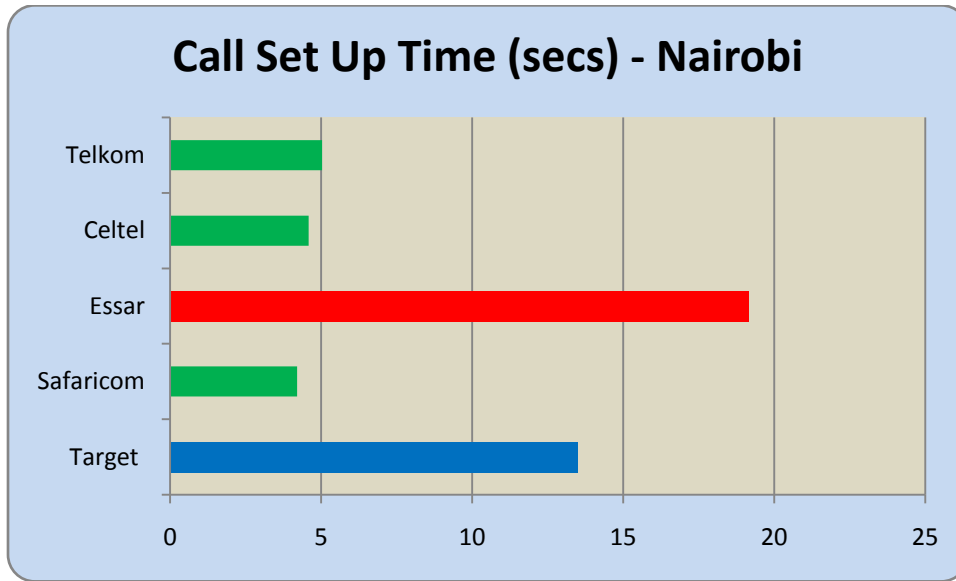
All the operators however met the targets on handover Success Rate.

Figure 22



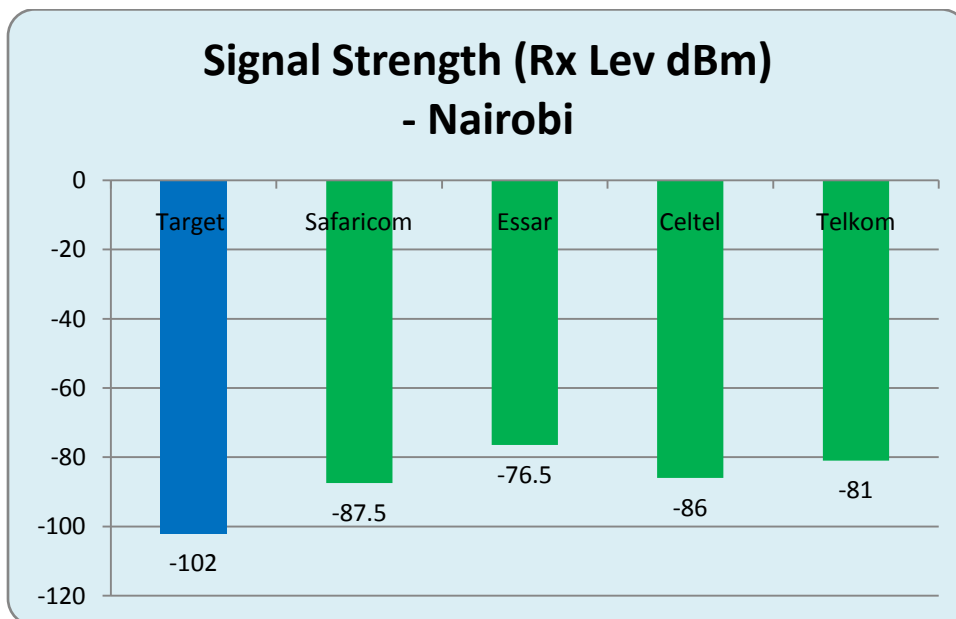
All the operators failed to meet their speech quality targets in Nairobi except Celtel which also met the target marginally.

Figure 23



On Call Set Up time, the worst performing operator is Essar with the all calls in all the regions being set up at more than 16 seconds and an average of 19 seconds against a target of 13.5seconds.

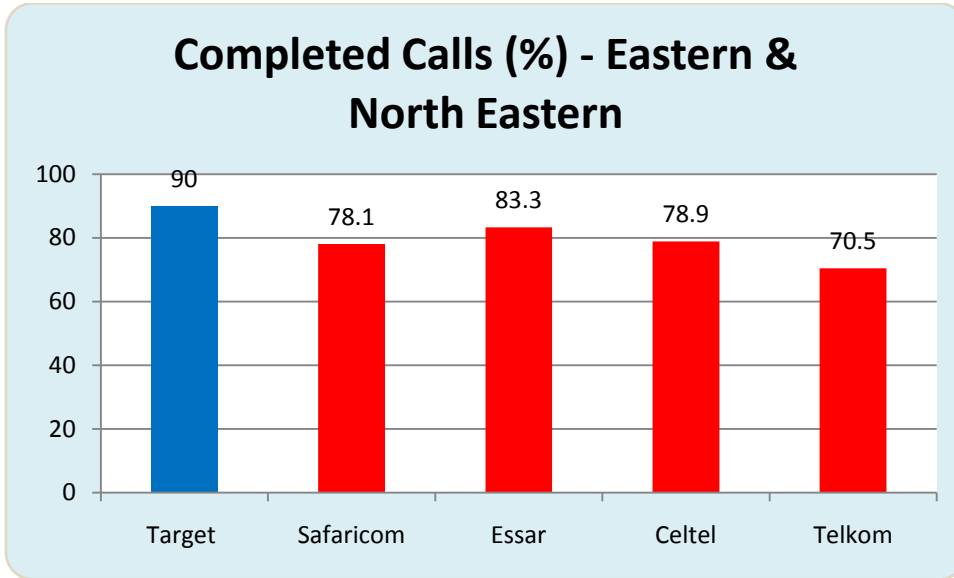
Figure 24



Signal strength is another parameter where all the operators met their targets in all the regions.

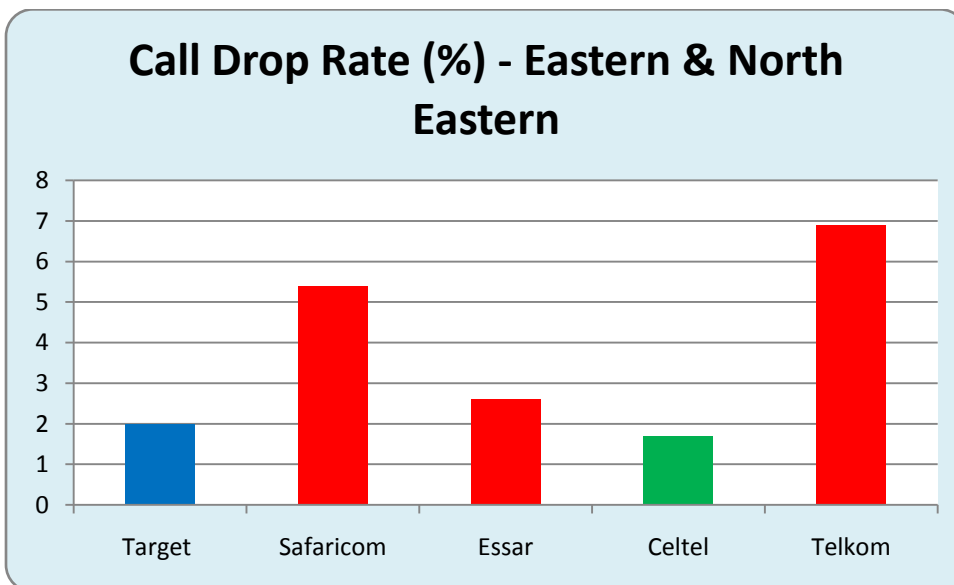
c) Eastern & North Eastern Regions

Figure 25



This region had the worst performance on Completed calls for all the four operators. None of the operators met their targets on this parameter.

Figure 26



On Call Drop Rate, only Celtel Managed to meet their targets in this region while the other three operators failed to meet their targets

Figure 27

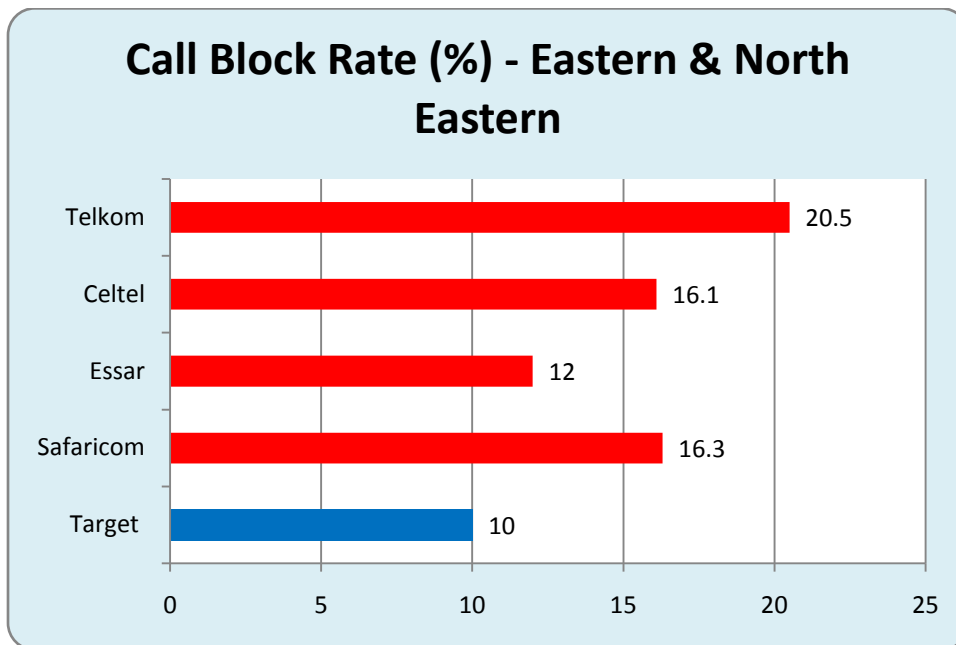
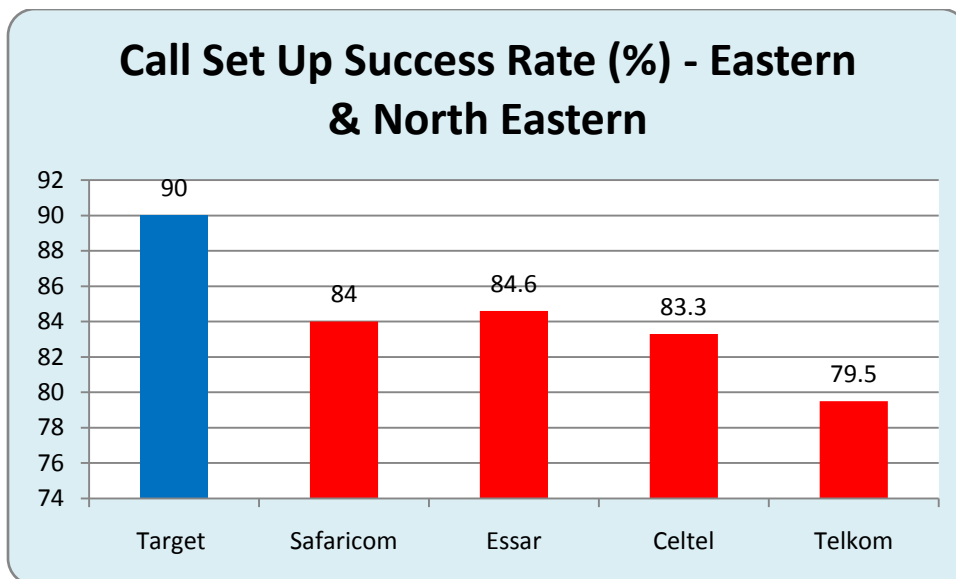


Figure 28



This region had the worst performance from the four operators with both Call Block Rate and Call Set Up Success Rate also registering poor performance alongside completed calls.

Figure 29

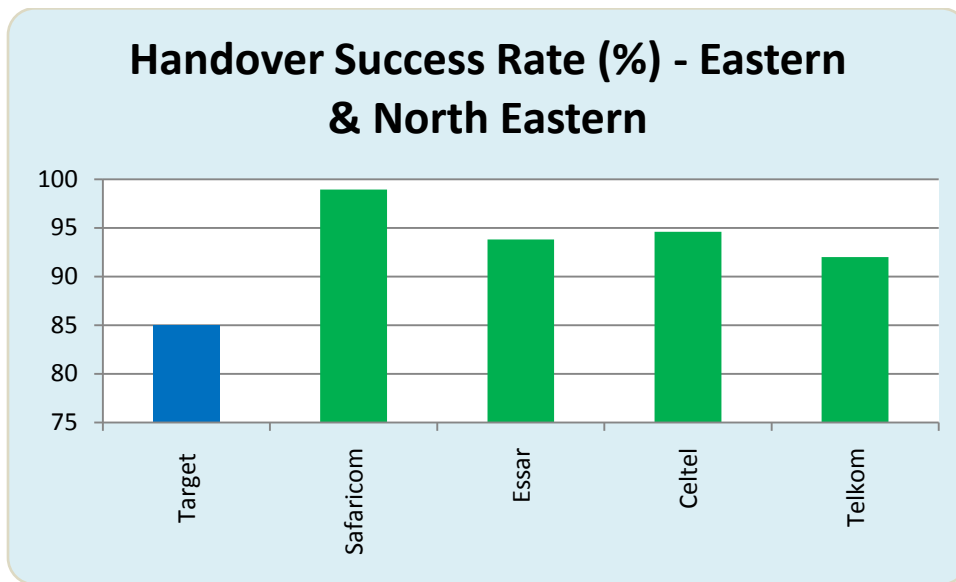
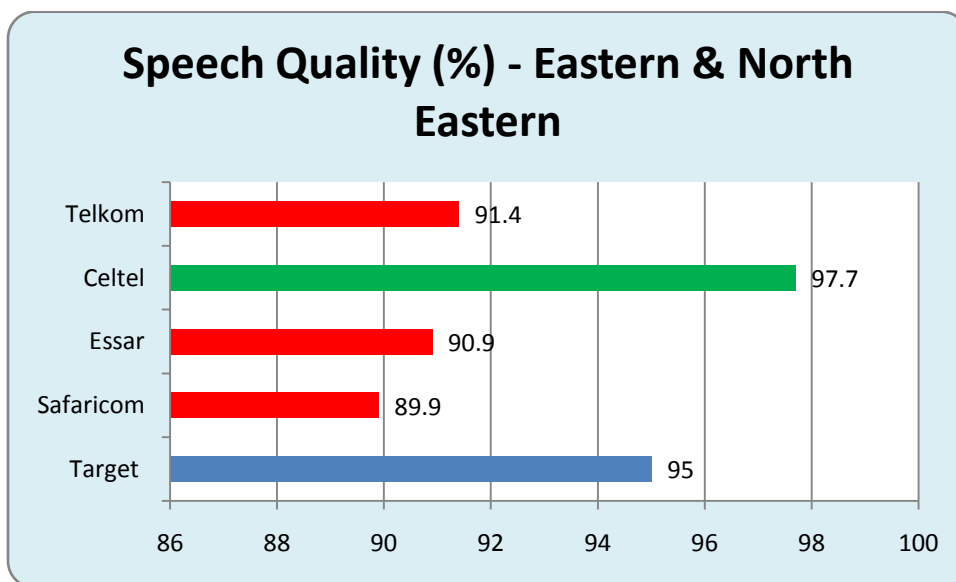
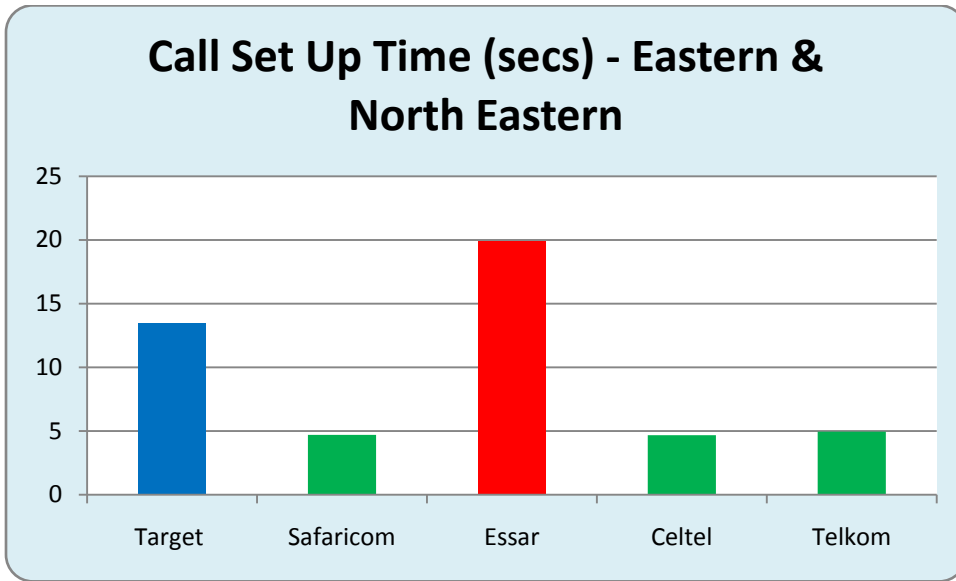


Figure 30



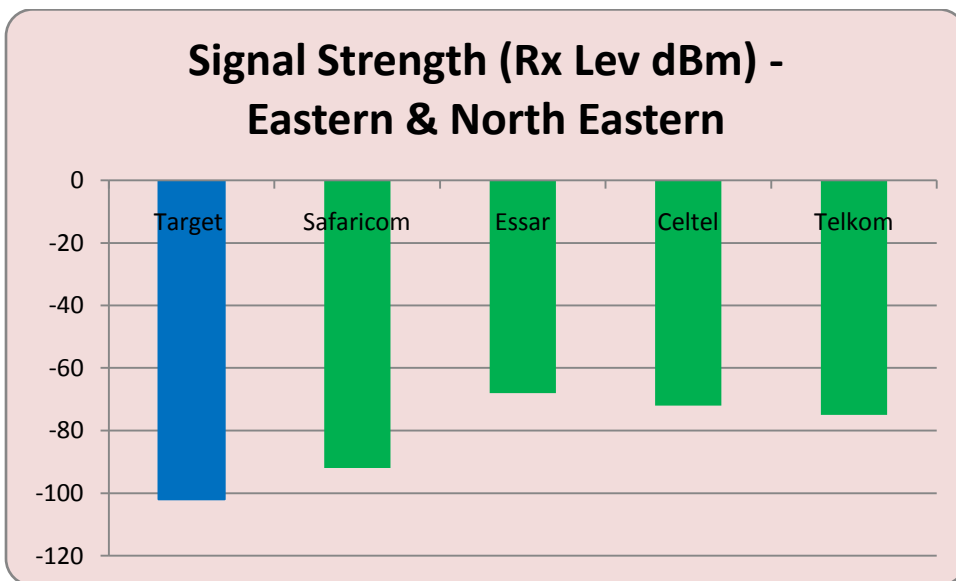
Like in Nairobi, only Celtel managed to meet their speech quality target in Eastern and North Eastern region while the rest failed to meet their target. However all the operators registered good performance on Hand over Success Rate as shown in figure 30 above.

Figure 31



As in all other regions, Essar performed poorly in Call Set Up Time registering over 19 seconds in call set up while other operators performance was below 5 seconds.

Figure 32



d) Western and Nyanza

In these regions, **Celtel** and **Telkom** performed poorly on;

- a) Completed Calls – see figure 34
- b) Call Block Rate - see figure 36
- c) Call Sep Up Success Rate - see figure 37

Safaricom Failed to meet their targets on

- d) Completed Calls - see figure 34
- a) Call Drop Rate - see figure 35
- b) Speech Quality - see figure 39

While **Essar** failed to meet their targets on

- a) Speech Quality - see figure 39
- b) Call Set Up Time - see figure 40

Figure 33

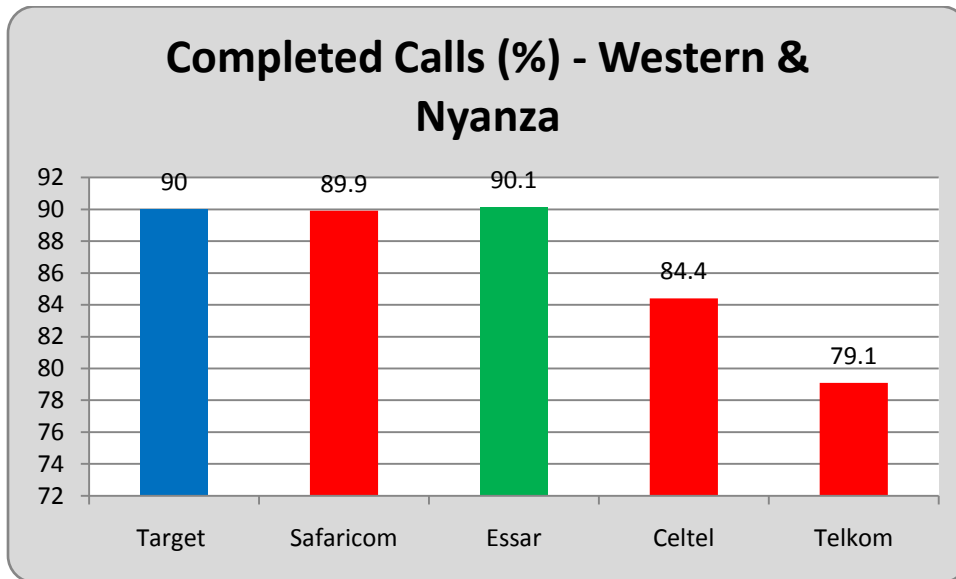


Figure 34

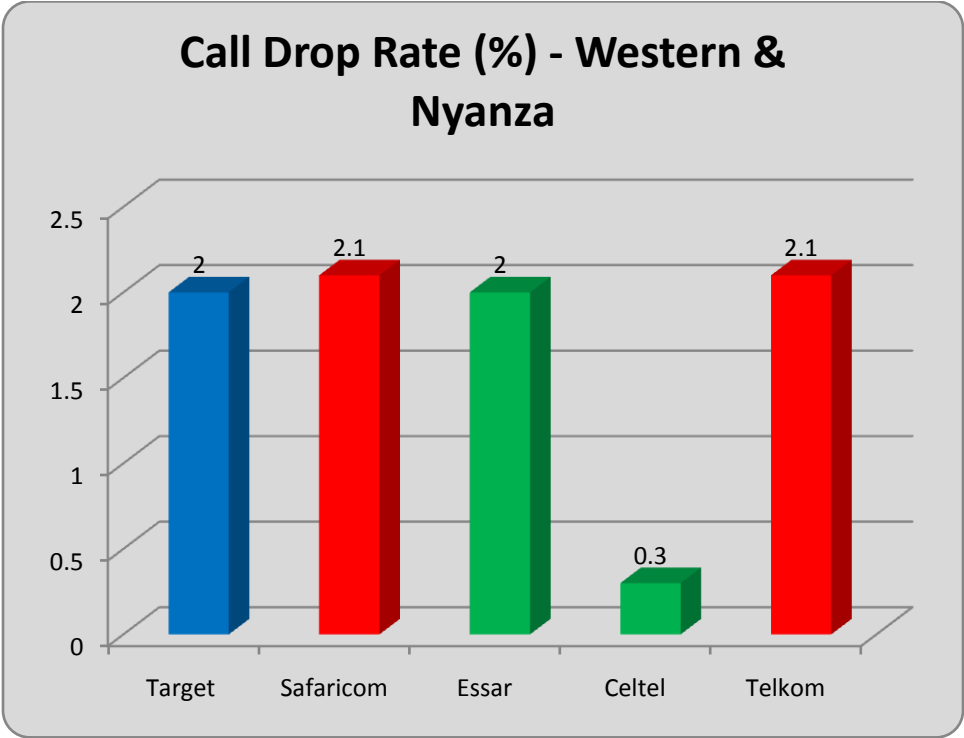


Figure 35

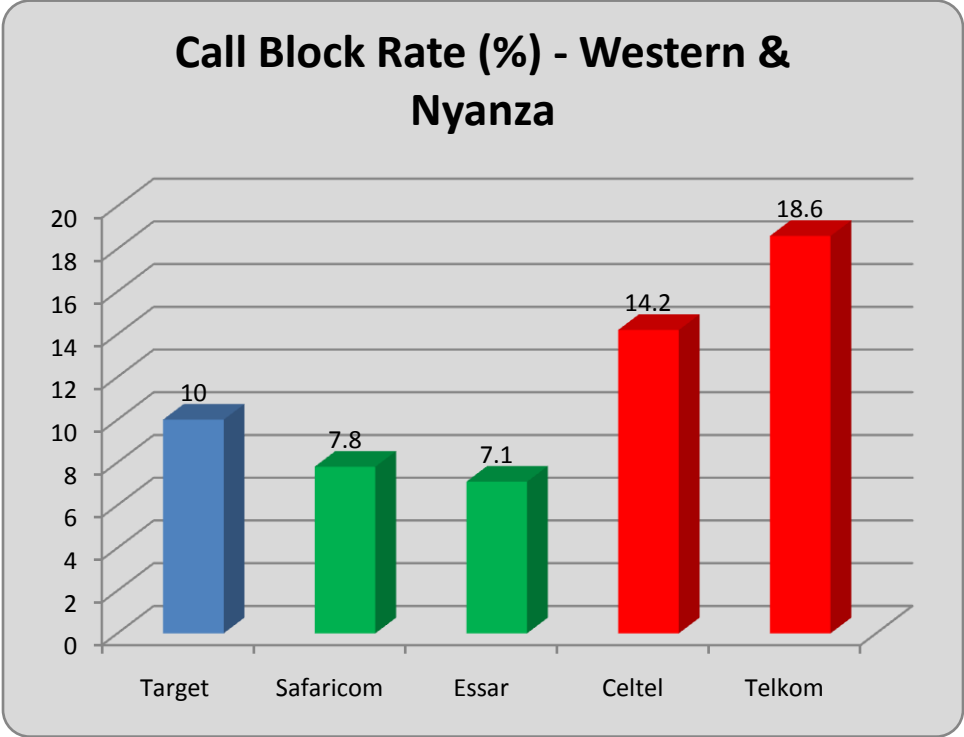


Figure 36

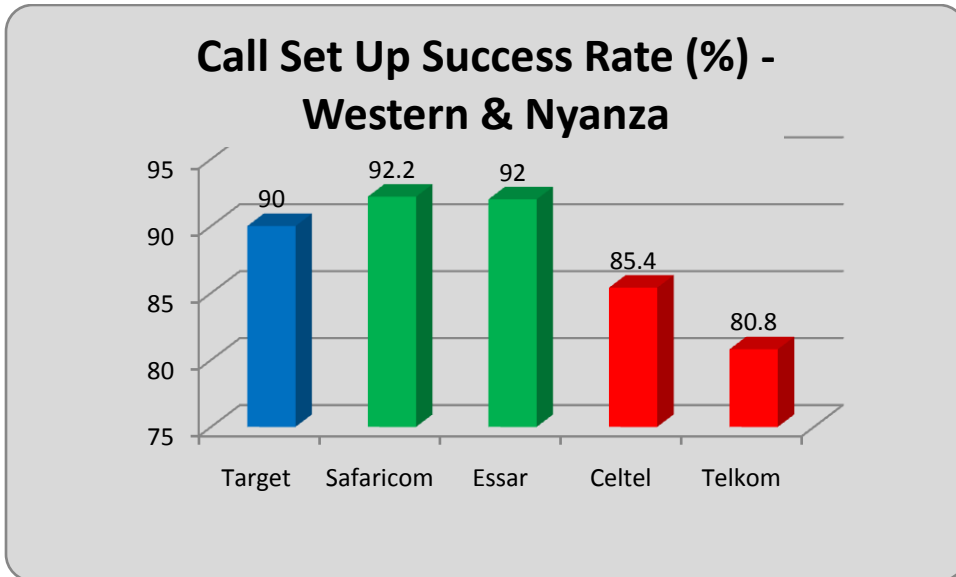


Figure 37

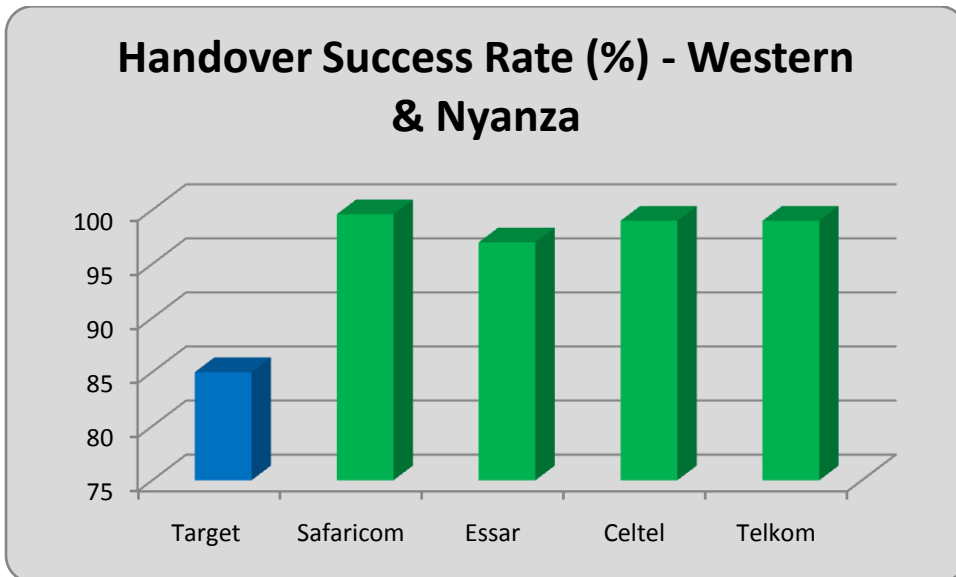


Figure 38

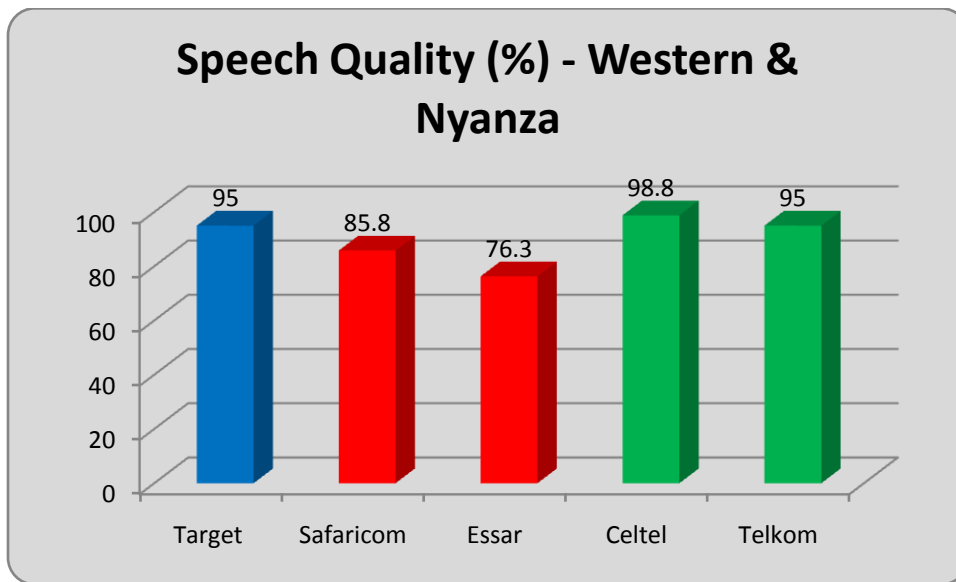


Figure 39

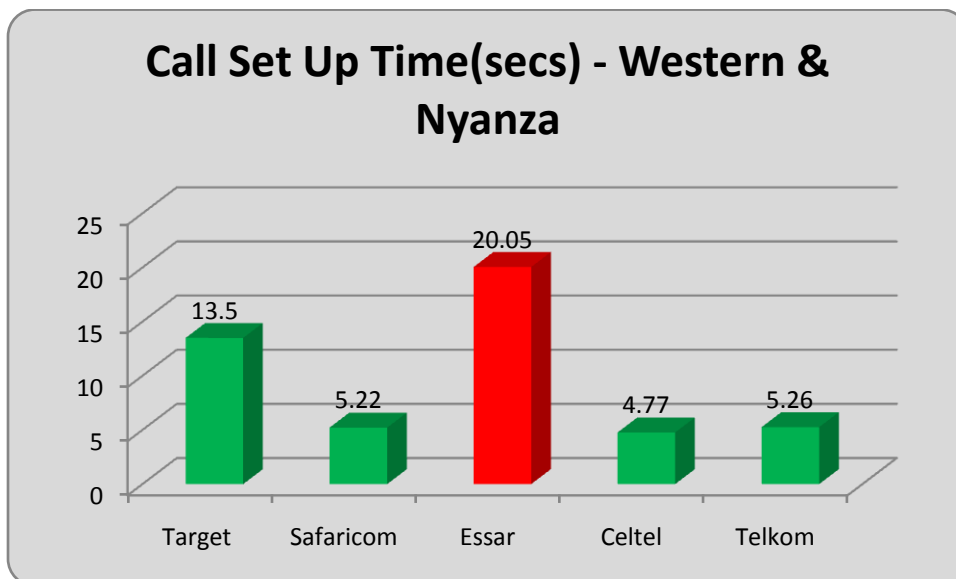
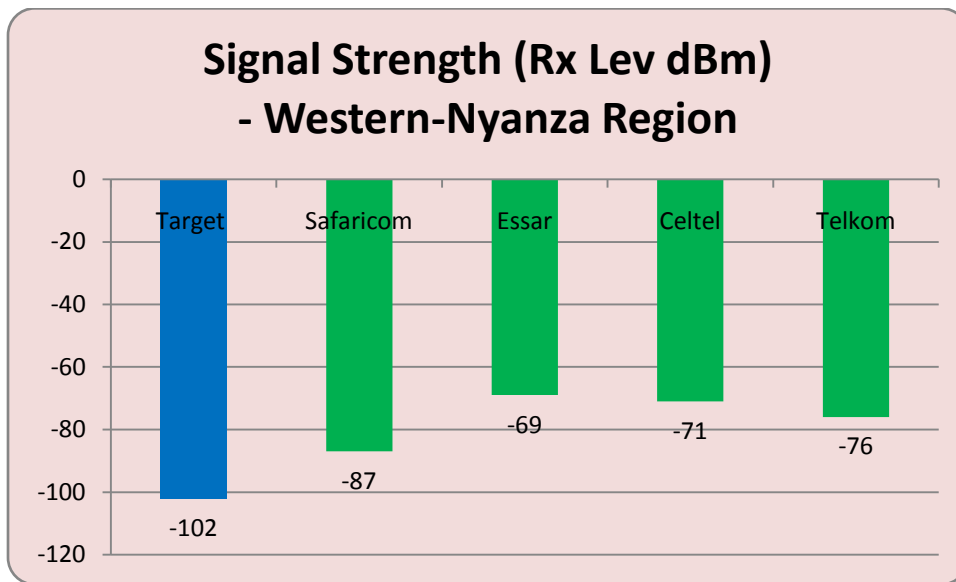


Figure 40



e) Central and Rift Valley

In these regions **Safaricom** and **Telkom** had the worst performance in the following parameters;

- a) Completed Calls – See Fig 42
- b) Call Block Rate - See Figure 44
- c) Call Set Up Success Rate - See Figure 45

However both **Celtel** and **Essar** met their targets in all the above parameters.

Whereas **Essar** failed to meet their targets on Speech quality (see figure 47) and Call Set Up Success Rate (see figure 48), the other three operators met their targets on these parameters.

All the operators met the targets on Call Drop Rate (figure 43), Handover Success Rate (figure 46) and Signal Strength (figure 49).

Figure 41

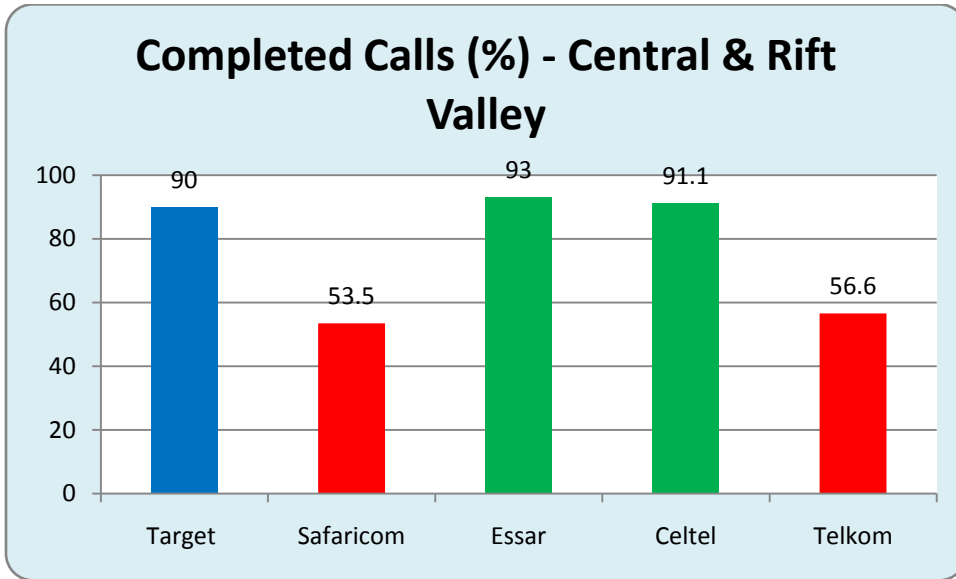


Figure 42

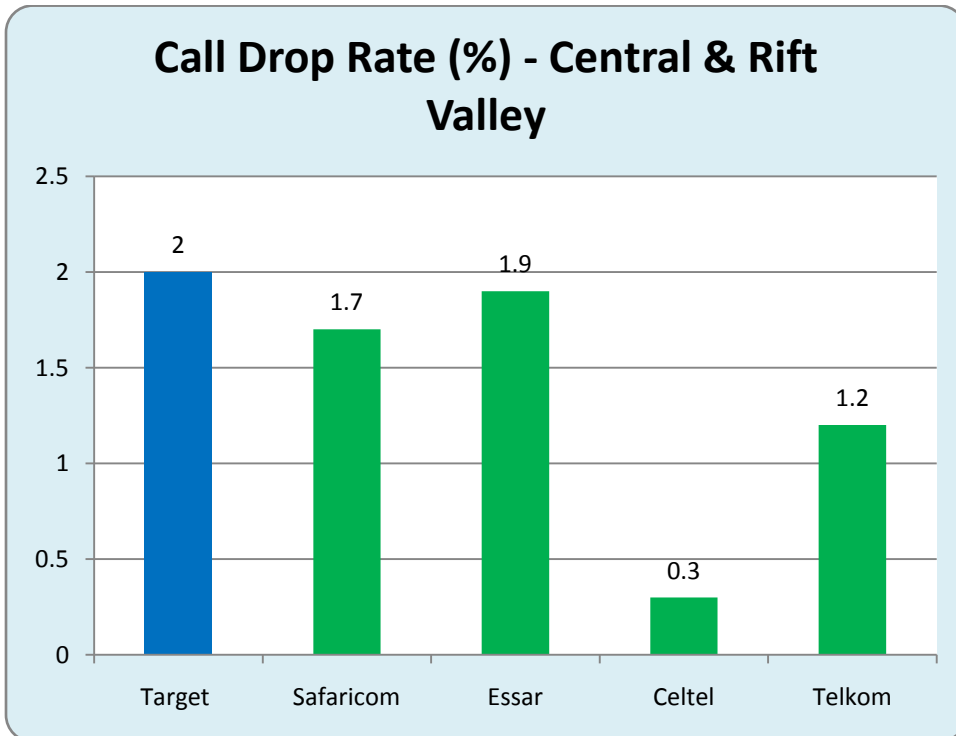


Figure 43

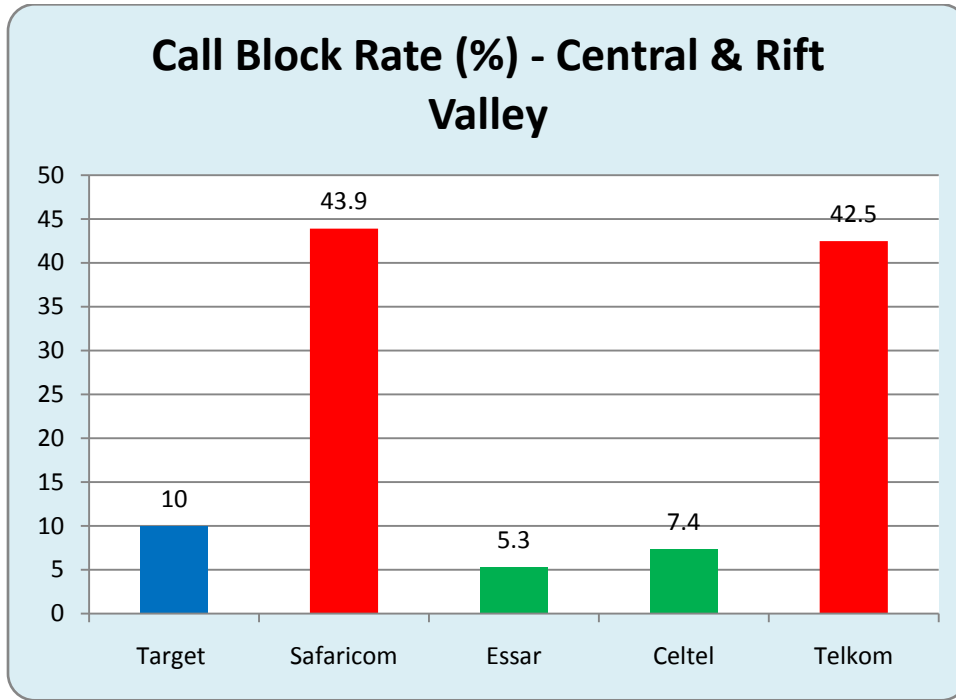


Figure 44

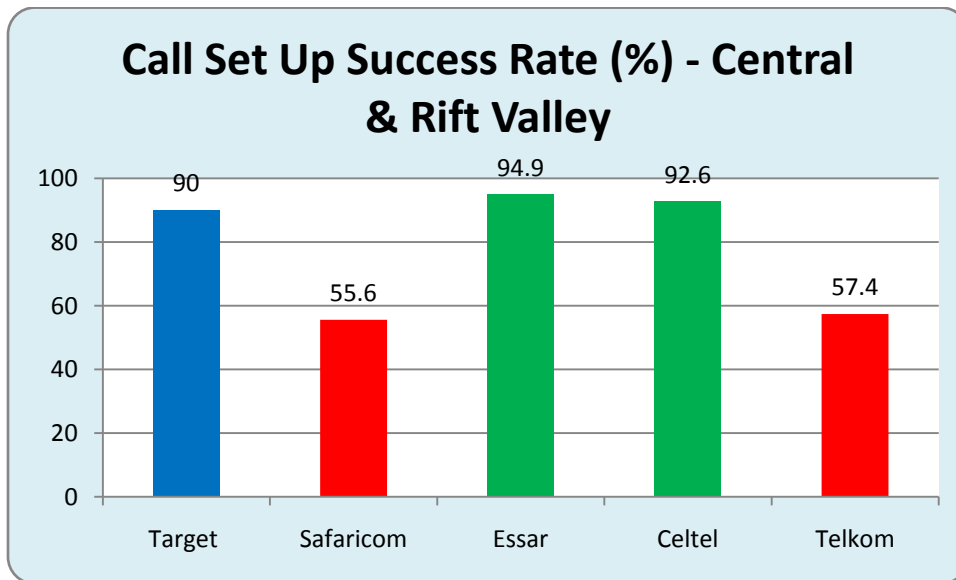


Figure 45

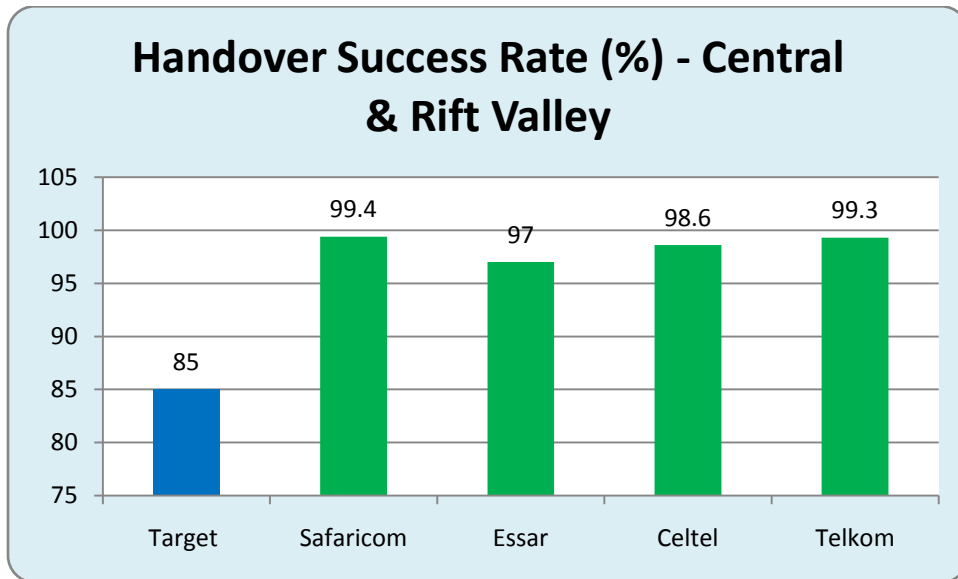


Figure 46

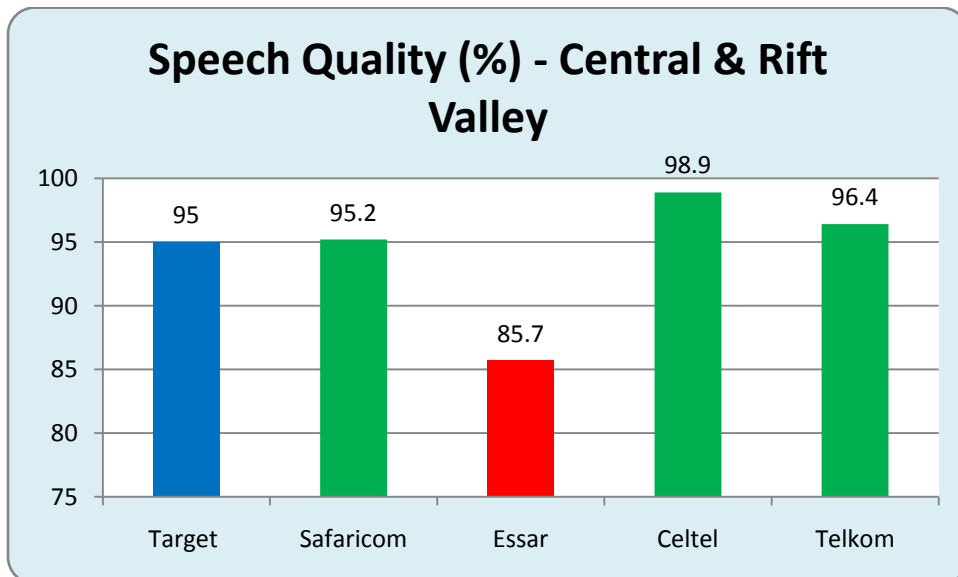


Figure 47

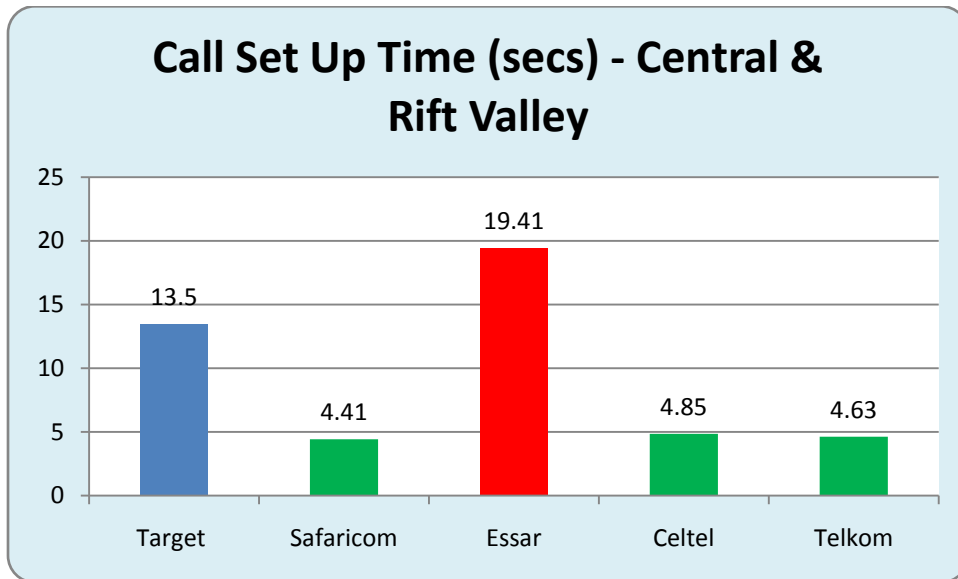


Figure 48

