



NATIONAL COMMUNICATIONS AUTHORITY

## 3G Coverage Assessment of Cellular Mobile Services- Northern Region

---

*[August – September 2016]*

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST –  
SEPTEMBER 2016**

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## Background

In pursuance of obligations of the 3G Cellular Mobile Licence of Telecommunication Operators, the consumer perspective of the 3G Coverage status is tested to ensure the compliance of Operators to the obligations on 3G Coverage to the user.

The report is based on findings on 3G verification campaign in the Northern Region from 6<sup>th</sup> August to 1<sup>st</sup> September 2016 for all Operators except Espresso due to technical challenges.

## What we measure

As per the 3G Cellular Mobile licence obligations, 3G-locked mode coverage samples are collected to obtain on the average a signal strength measurement which is representative of the coverage situation in each of the District Capital that was driven.

The 3G Signal Strength and their respective threshold for compliance considering the user’s perspective are categorised as follows;

Rating	3G Signal Strength Range (dBm)
No 3G Coverage	$-105 > \text{RSCP}$
Poor	$-105 \leq \text{RSCP} < -95$
Fair	$-95 \leq \text{RSCP} < -85$
Good	$-85 \leq \text{RSCP} < -20$

## Findings

The results for the district capitals within Northern Region tested during the period are as below:

**Table 1: Coverage Signal strength, August – September, 2016**

DISTRICT CAPITAL	MTN	VODAFONE	TIGO	AIRTEL	GLO
Bimbilla	Fair	Good	Fair	Fair	No 3G Coverage
Bole	Good	Good	Fair	Fair	No 3G Coverage
Buipe	Good	Fair	No 3G Coverage	Fair	No 3G Coverage

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DISTRICT CAPITAL	MTN	VODAFONE	TIGO	AIRTEL	GLO
Bunkpurugu	Good	Good	Fair	Fair	No 3G Coverage
Chereponi	Good	Good	Good	Fair	No 3G Coverage
Daboya	No 3G Coverage				
Damongo	Fair	Good	Fair	Fair	No 3G Coverage
Gambaga	Good	Good	Fair	Fair	No 3G Coverage
Gushegu	Fair	Good	Fair	Fair	No 3G Coverage
Karaga	Good	Good	Good	Fair	No 3G Coverage
Kumbungu	No 3G Coverage	Good	No 3G Coverage	No 3G Coverage	No 3G Coverage
Saboba	Fair	Good	Fair	Fair	No 3G Coverage
Sagnarigu	Good	Good	Fair	Fair	Fair
Salaga	Good	No 3G Coverage	Poor	Fair	No 3G Coverage
Sang	No 3G Coverage				
Savelugu	Fair	Good	Fair	Fair	No 3G Coverage
Sawla	Good	Good	Good	Fair	No 3G Coverage
Tamale	Good	Fair	Fair	Fair	Fair
Tatale	No 3G Coverage				
Walewale	Good	Fair	Poor	Fair	No 3G Coverage
Yagaba	No 3G Coverage	No 3G Coverage	Fair	No 3G Coverage	No 3G Coverage
Yendi	Good	Fair	Poor	Poor	No 3G Coverage
Zabzugu	Fair	Good	Fair	Poor	No 3G Coverage

**REMARKS:**

- ❖ All Operators had no 3G network coverage at Daboya, Sang and Tatale District Capitals.
- ❖ All Operators except Vodafone had no 3G network coverage at Kumbungu.
- ❖ All Operators except Tigo had no 3G network coverage at Yagaba.

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- ❖ MTN had good 3G coverage in all the covered District Capitals except Bimbilla, Damongo, Gushegu, Saboba, Savelugu and Zabzugu which had “fair” 3G network coverage.
- ❖ Vodafone had good 3G coverage in all the covered District Capitals except Buipe, Tamale, Walewale and Yendi which had “fair” 3G network coverage.
- ❖ Vodafone had no 3G coverage at Salaga due to 3G service outage in the District Capital on the day of the drive test.
- ❖ Tigo had good 3G coverage at Chereponi, Karaga and Sawla.
- ❖ Tigo had fair 3G network coverage at Bimbilla, Bole, Bunkpurugu, Damongo, Gambaga, Gushegu, Saboba, Sagnarigu, Savelugu, Tamale, Yagaba and Zabzugu.
- ❖ Tigo had poor 3G coverage at Salaga, Walewale and Yendi.
- ❖ Tigo had no 3G coverage at Buipe, Daboya, Kumbungu, Sang and Tatale.
- ❖ Airtel had fair 3G coverage in all the covered Districts except Yendi and Zabzugu which had poor 3G coverage.
- ❖ Airtel had no 3G coverage at Daboya, Kumbungu, Sang, Tatale and Yagaba.
- ❖ Glo did not have 3G network coverage in all the District Capitals tested except Sagnarigu and Tamale which had fair 3G coverage.

### **Remedies**

- ❖ The NCA has notified Operators of these findings and has directed all Operators to improve their coverage in some localities by December, 2016.
- ❖ All Operators have been directed to extend 3G coverage to Daboya, Sang and Tatale District Capitals by December, 2016.
- ❖ Vodafone has been sanctioned for failing to maintain 3G coverage at Salaga.
- ❖ Glo has been granted moratorium till December, 2016 to cover all District Capitals in the Northern Region.

**APPENDICES**

**Coverage Signal Strength**

The Maps below show the coverage level in District Capitals of the Northern Region where monitoring was performed. The coverage map is based on the 3G network signal strength when tested in an idle mode. In each plot is a legend to indicate the signal strength and quality range attained by Operators during measurement.

Coverage levels in green falls in the range of -85dBm and above, and are considered good. Those between -85 and -95dBm are considered average or fair and are indicated in yellow. The red samples represent worse or poor coverage in the range of -95 to -105dBm. The black samples represent areas with no 3G coverage.

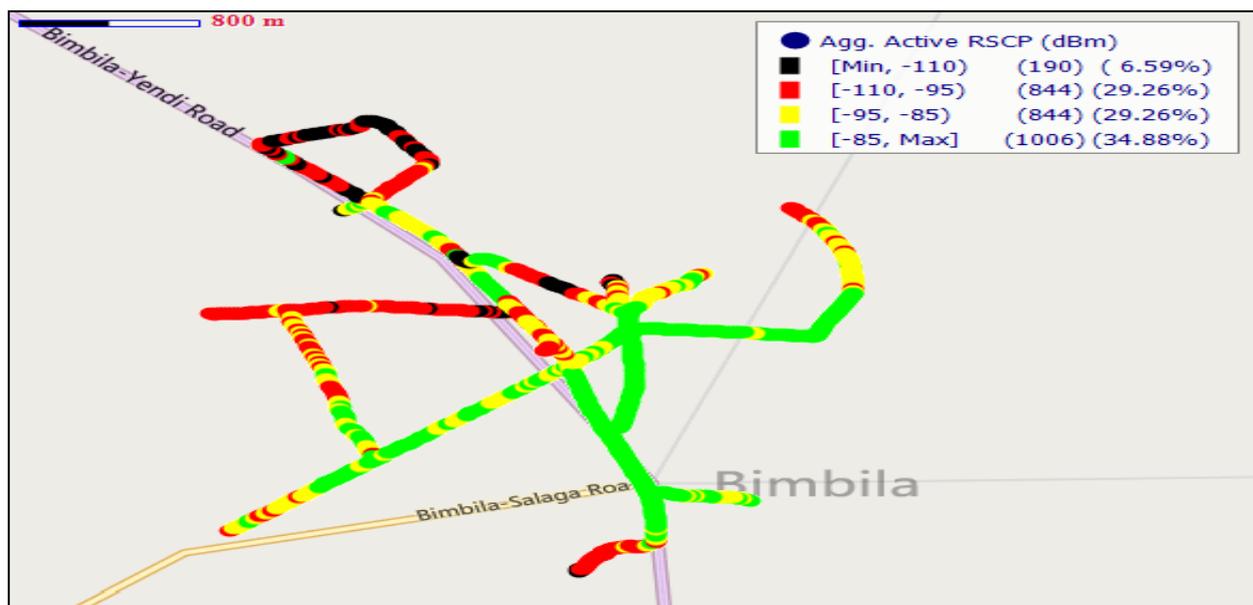
**Coverage Legend**

<i>Colour</i>	<i>Area Coverage Rating</i>
	Good Coverage Areas
	Fair Coverage Areas
	Poor Coverage Areas
	Non-Existent Coverage Areas

**APPENDIX I**

**COVERAGE AT BIMBILLA**

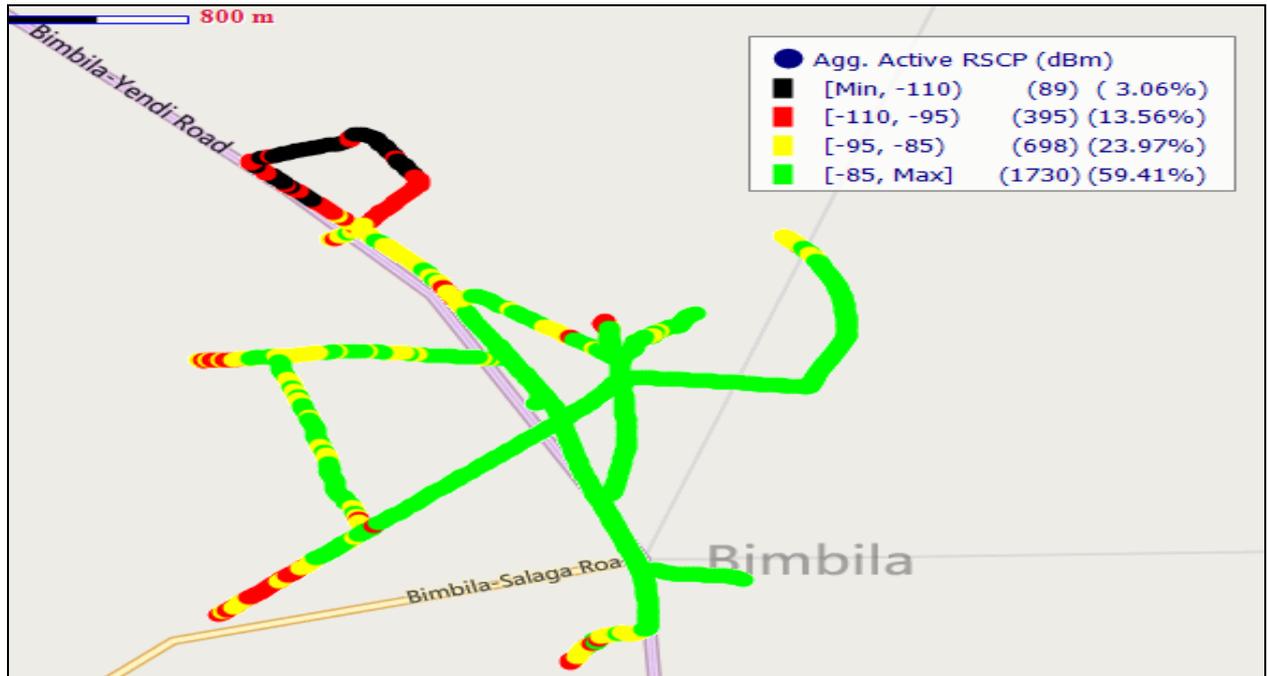
**Fig. 1 - MTN 3G Coverage Map, Bimbilla - August 2016**



**Remarks: Fair 3G coverage in Bimbilla; however, improvement is required at the Bimbilla Training College, Alarurin, District Magistrate Court and Lorry Station.**

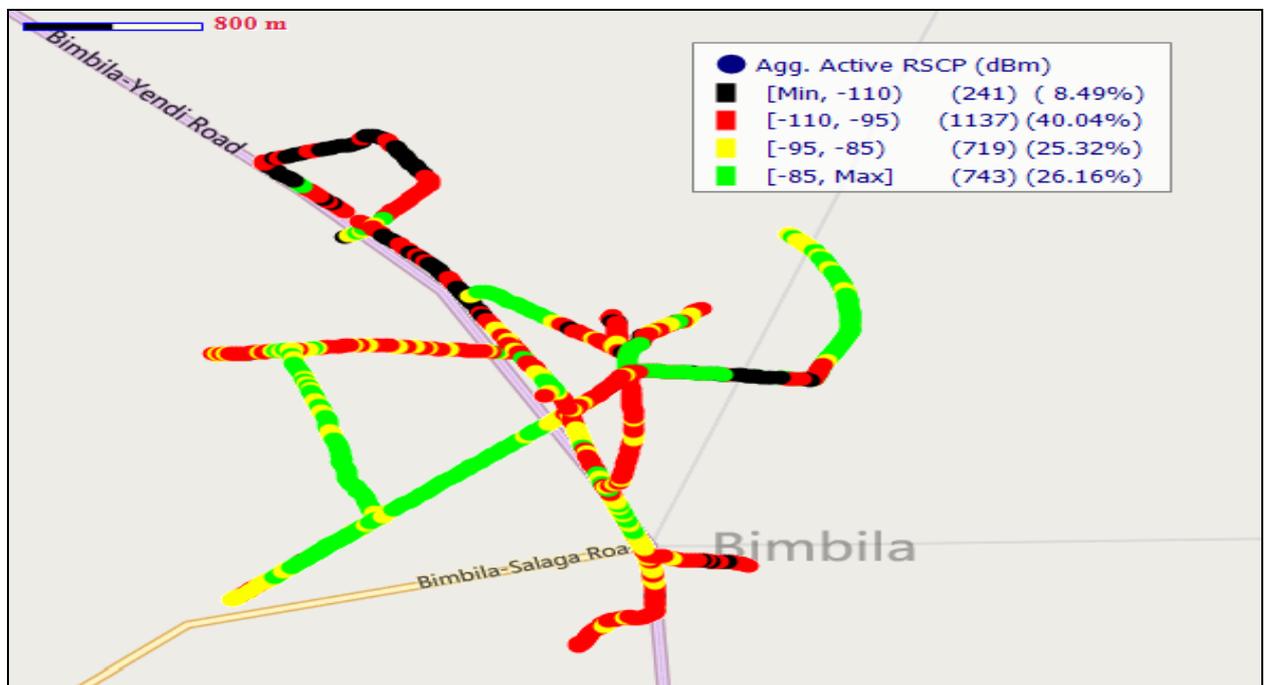
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 2 - Vodafone 3G Coverage Map, Bimbilla - August 2016**



**Remarks: Good 3G coverage in Bimbilla with improvement needed at Bimbilla Training College and District Assembly.**

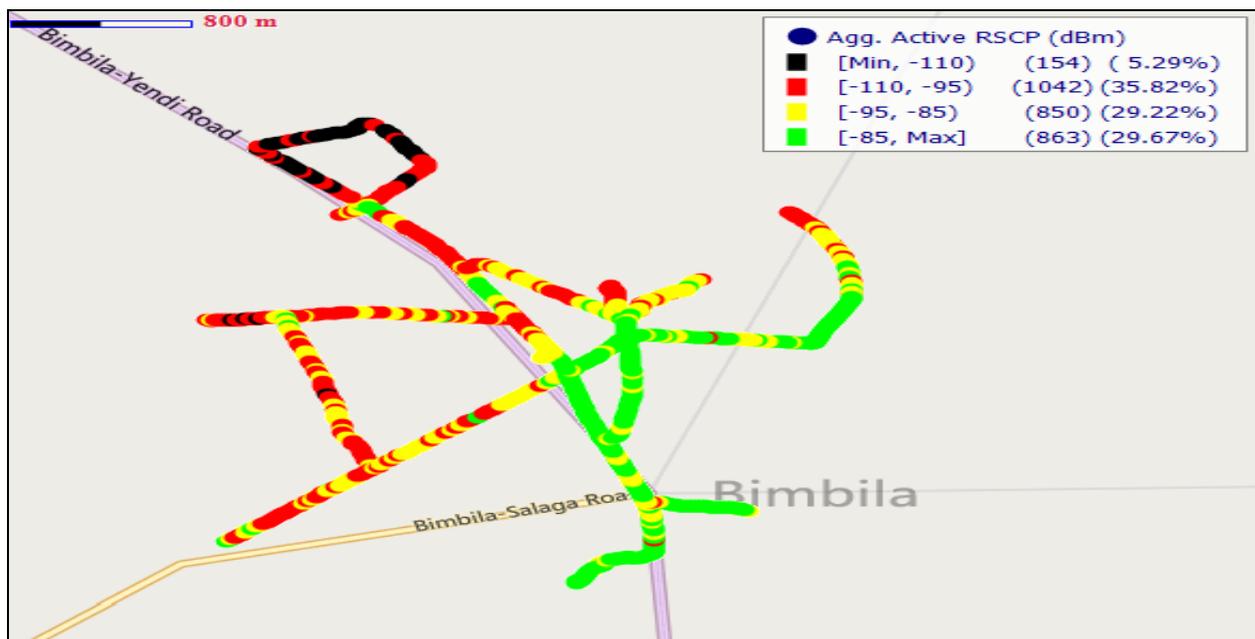
**Fig. 3 - Tigo 3G Coverage Map, Bimbilla - August 2016**



**Remarks: Fair 3G coverage in Bimbilla; however, improvement is required at Bimbilla Training College, District Magistrate Court and Madinafong.**

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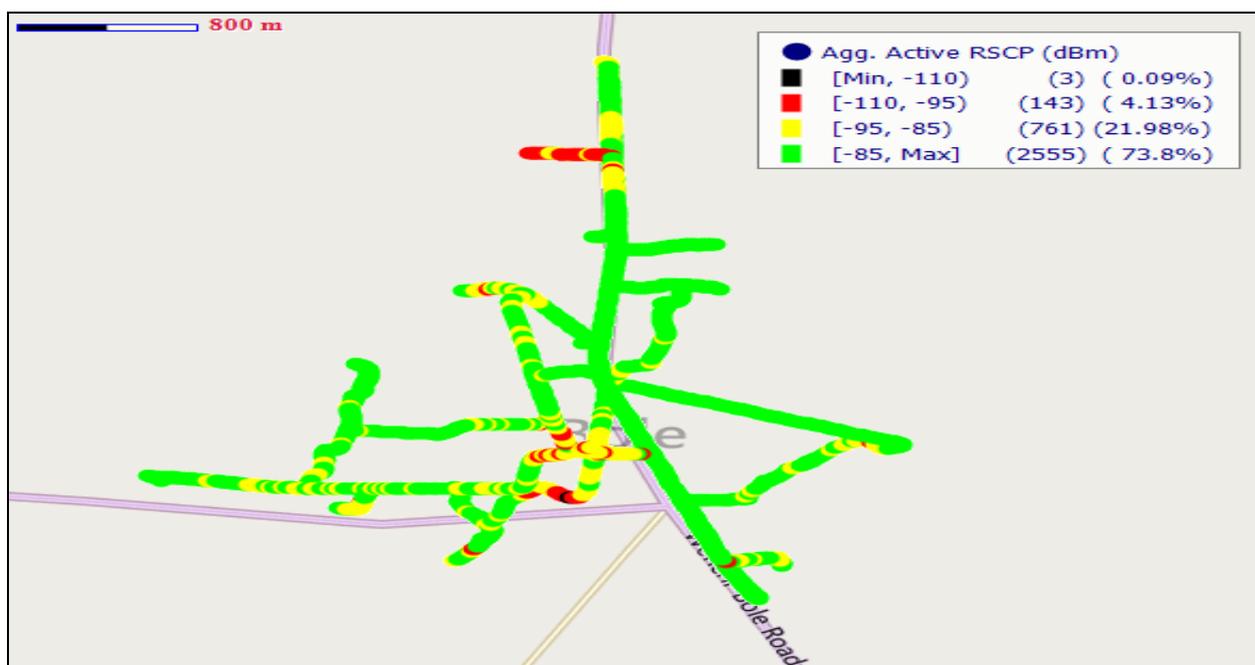
**Fig. 4 - Airtel 3G Coverage Map, Bimbilla - August 2016**



Remarks: Fair 3G coverage in Bimbilla. However, improvement is required at Bimbilla Training College, District Assembly and Alarurin.

**COVERAGE AT BOLE**

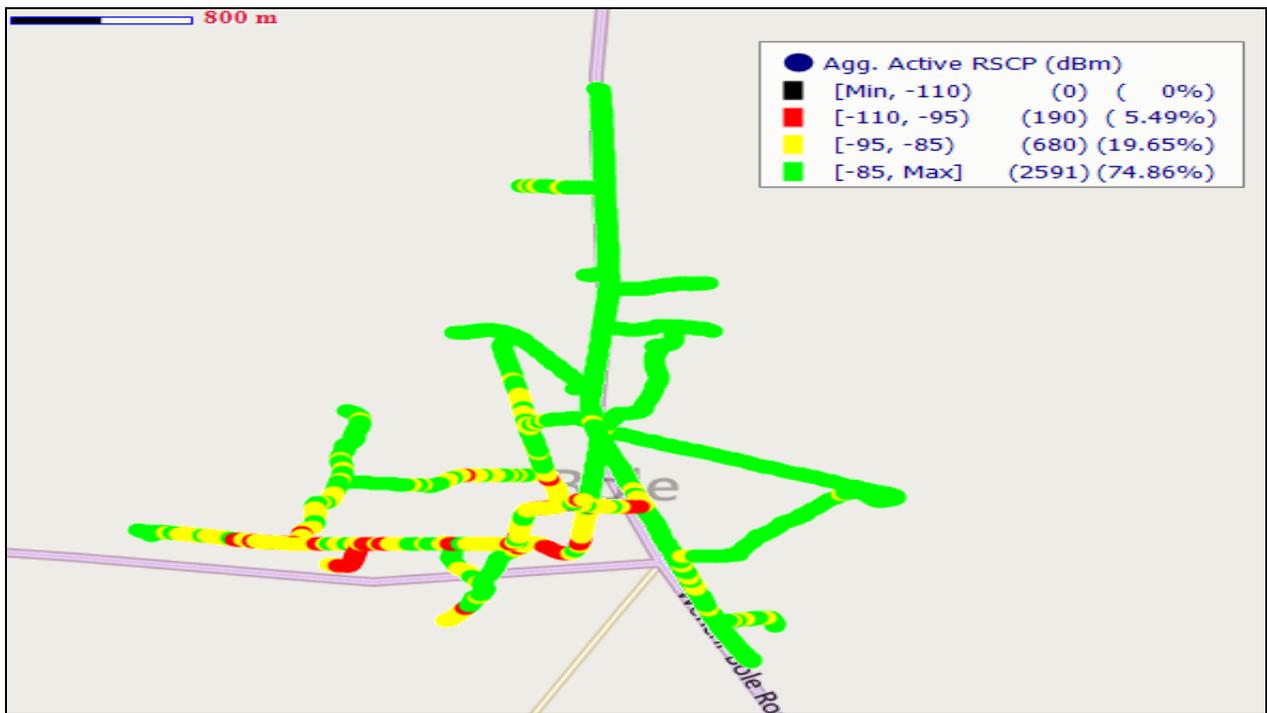
**Fig. 5 - MTN 3G Coverage Map, Bole - August 2016**



Remarks: Good 3G coverage with improvement needed at Taxi Station.

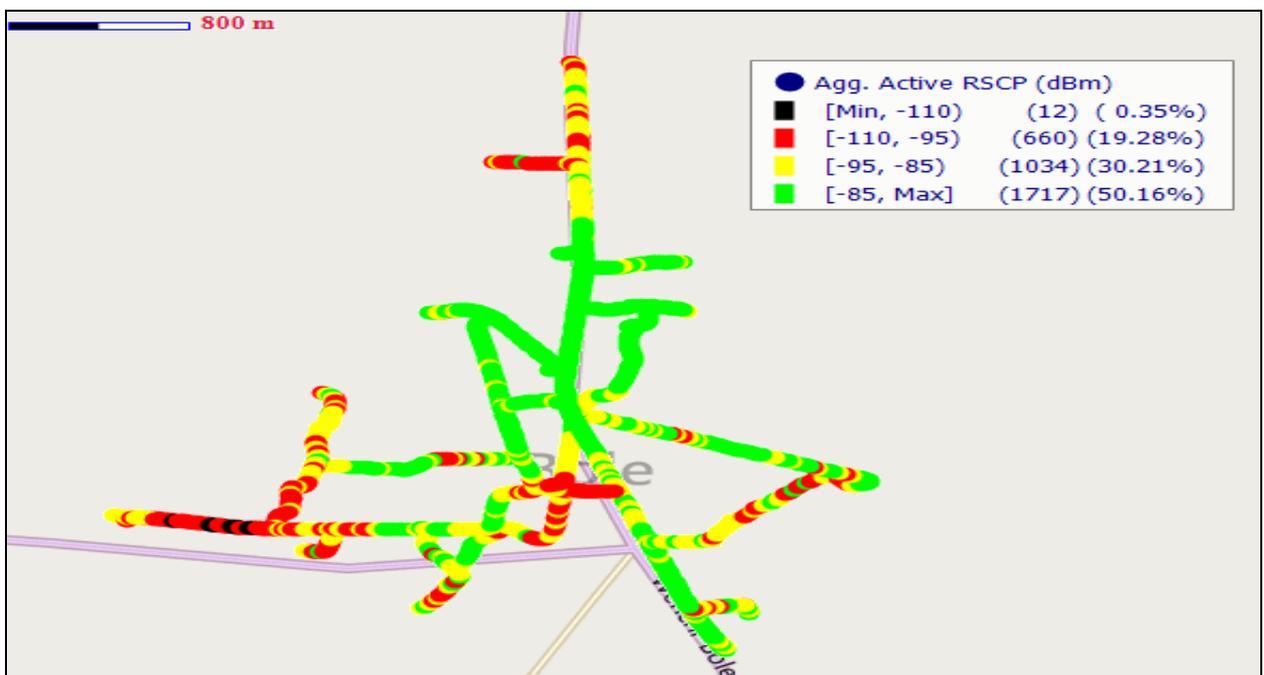
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 6 - Vodafone 3G Coverage Map, Bole - August 2016**



**Remarks: Good 3G coverage across Bole with improvement needed at Hospital and Taxi Station.**

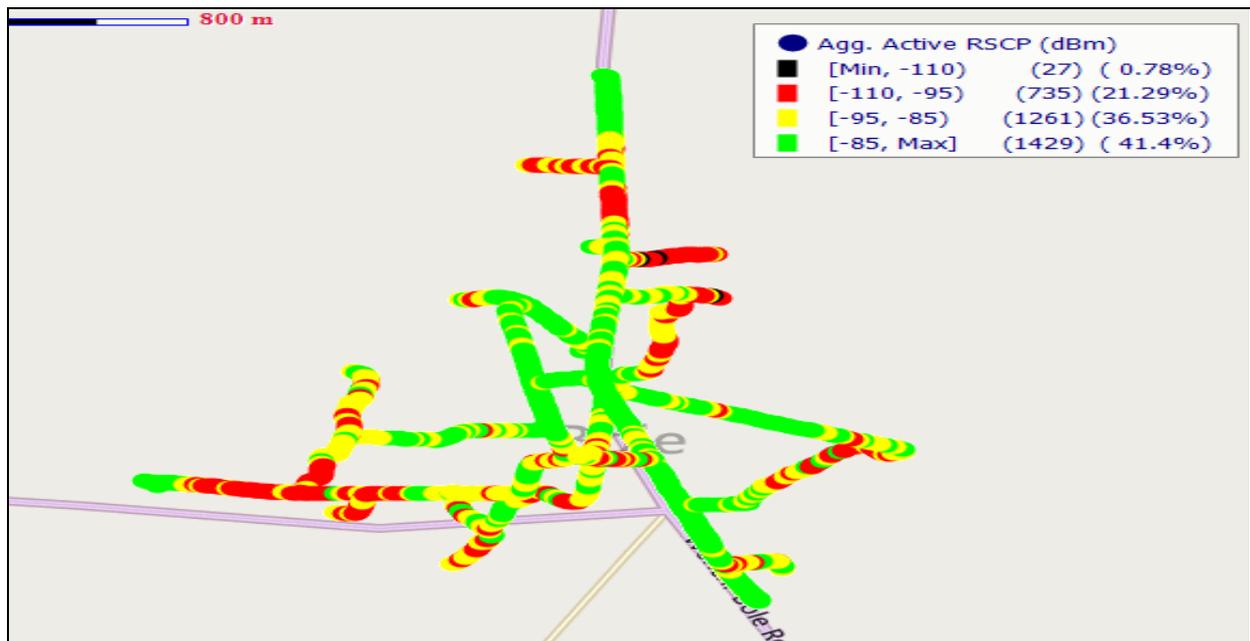
**Fig. 7 - Tigo 3G Coverage Map, Bole - August 2016**



**Remarks: Fair 3G coverage with spots of poor coverage across Bole which needs to be improved**

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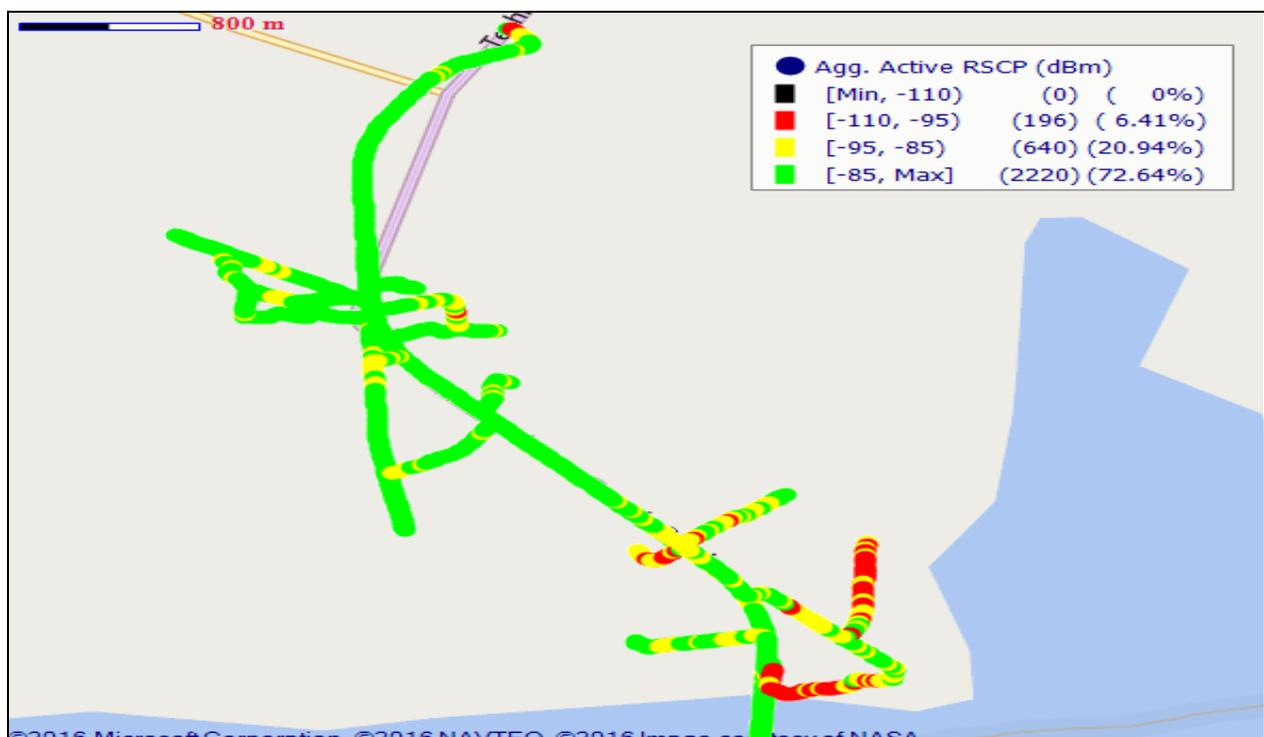
**Fig. 8 -Airtel 3G Coverage Map, Bole - August 2016**



Remarks: Fair 3G coverage with poor coverage spots across the entire Bole and its environs, which need improvement.

**COVERAGE AT BUIPE**

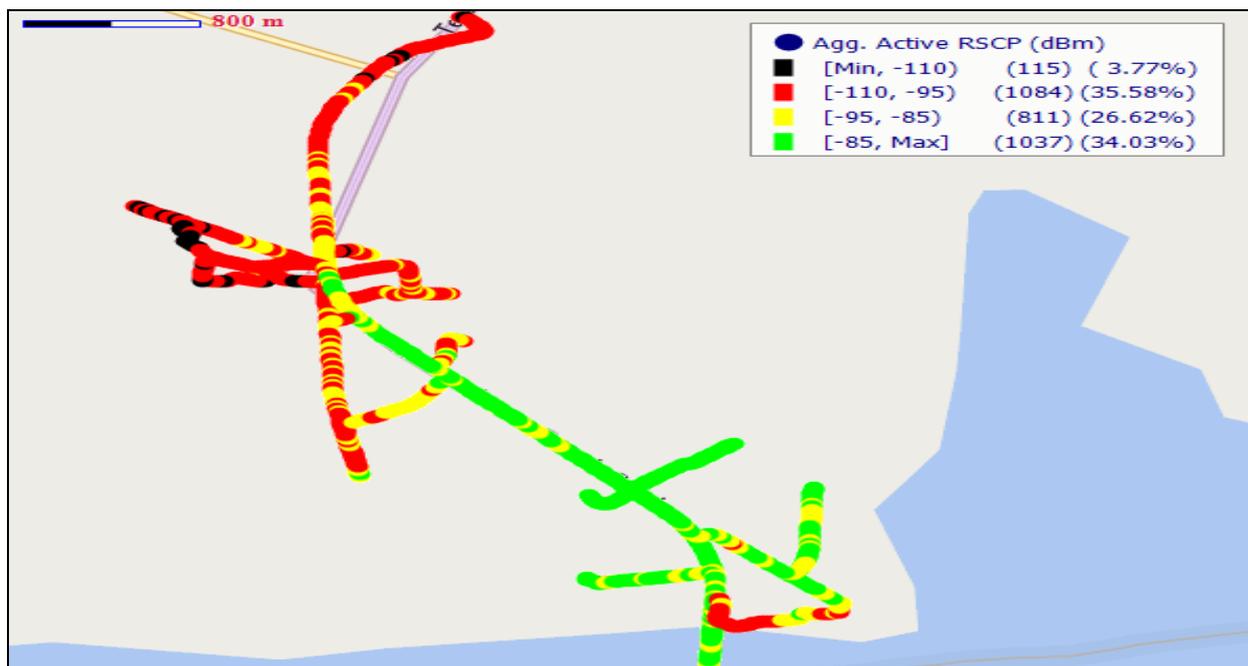
**Fig. 9 – MTN 3G Coverage Map, Buipe – August 2016**



Remarks: Good 3G coverage; however, improvement is needed at Bridge.

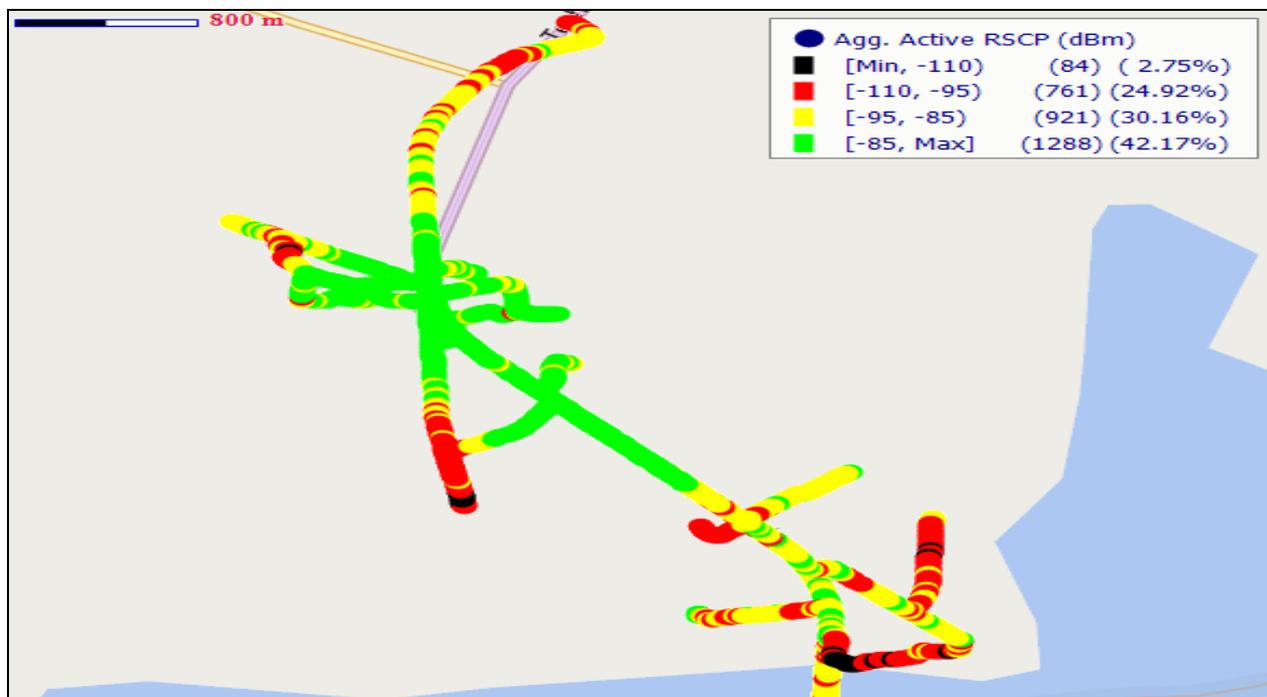
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**Fig. 10 - Vodafone 3G Coverage Map, Buipe –August 2016**



**Remarks:** Fair 3G coverage in Buipe; however improvement is required at Boduwase, Wolonto, Bridge, Yipala and Forestry Department.

**Fig. 11 - Airtel 3G Coverage Map, Buipe – August 2016**

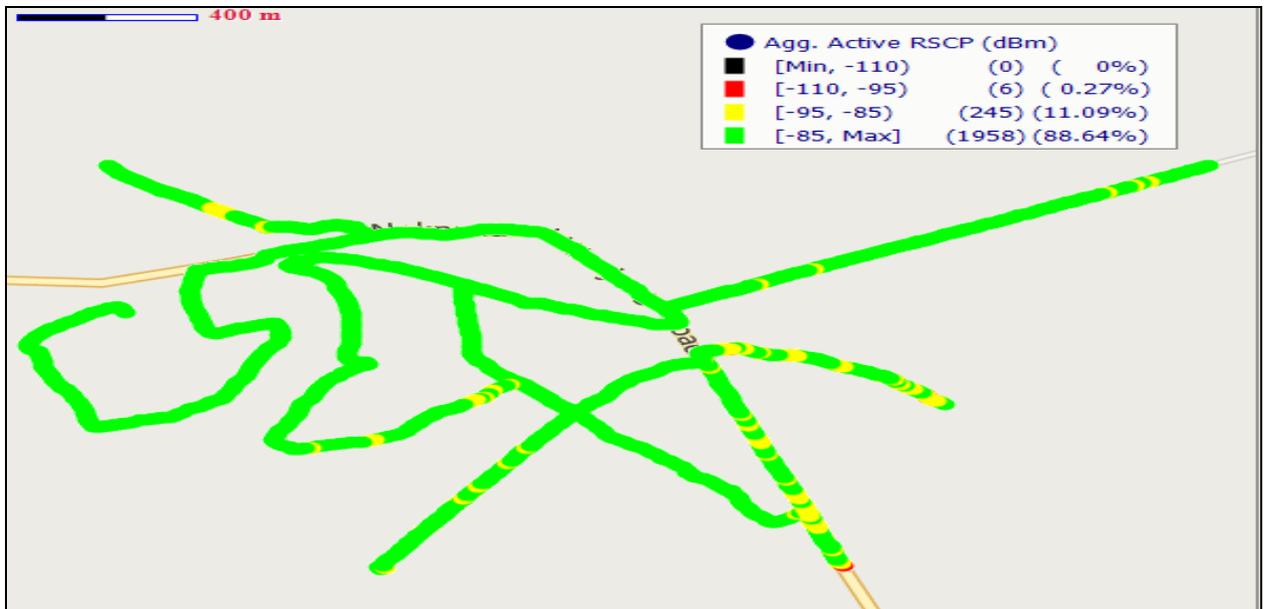


**Remarks:** Fair 3G coverage in Buipe. However, improvement is required at the District Assembly, Boduwase and Bridge.

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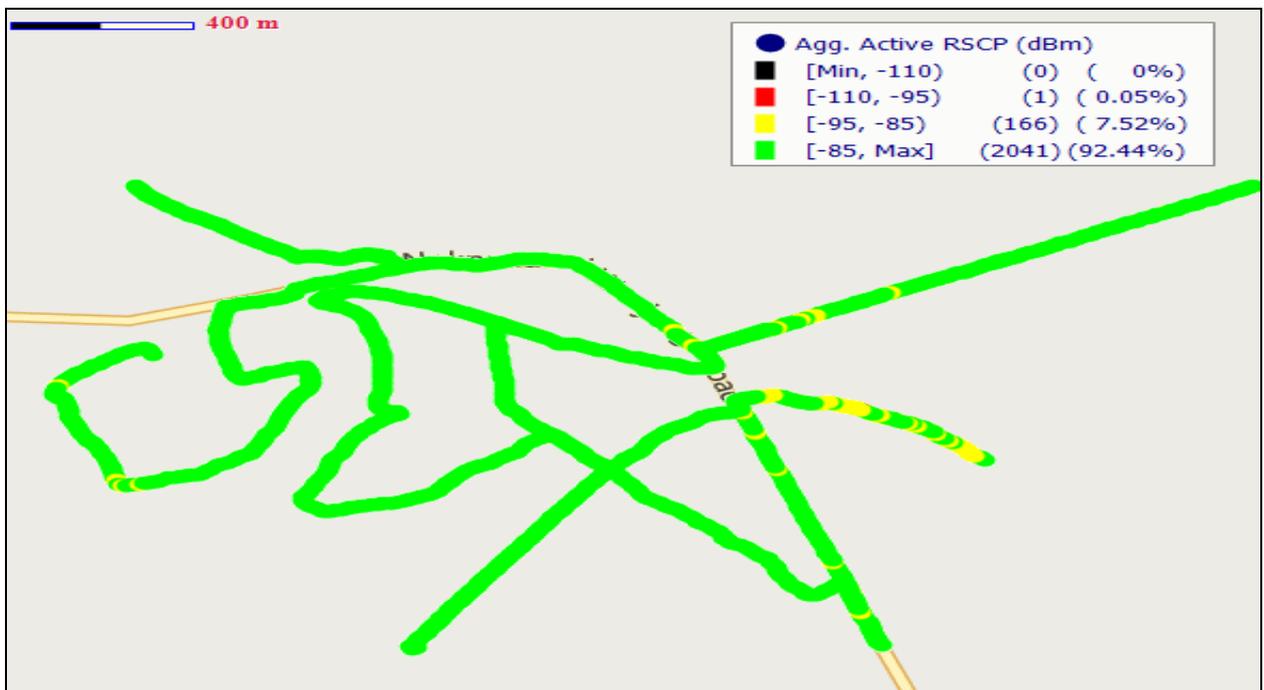
COVERAGE AT BUNKPURUGU/YUNYOO

Fig. 12 - MTN 3G Coverage Map, Bunkpurugu - August 2016



Remarks: Good 3G coverage.

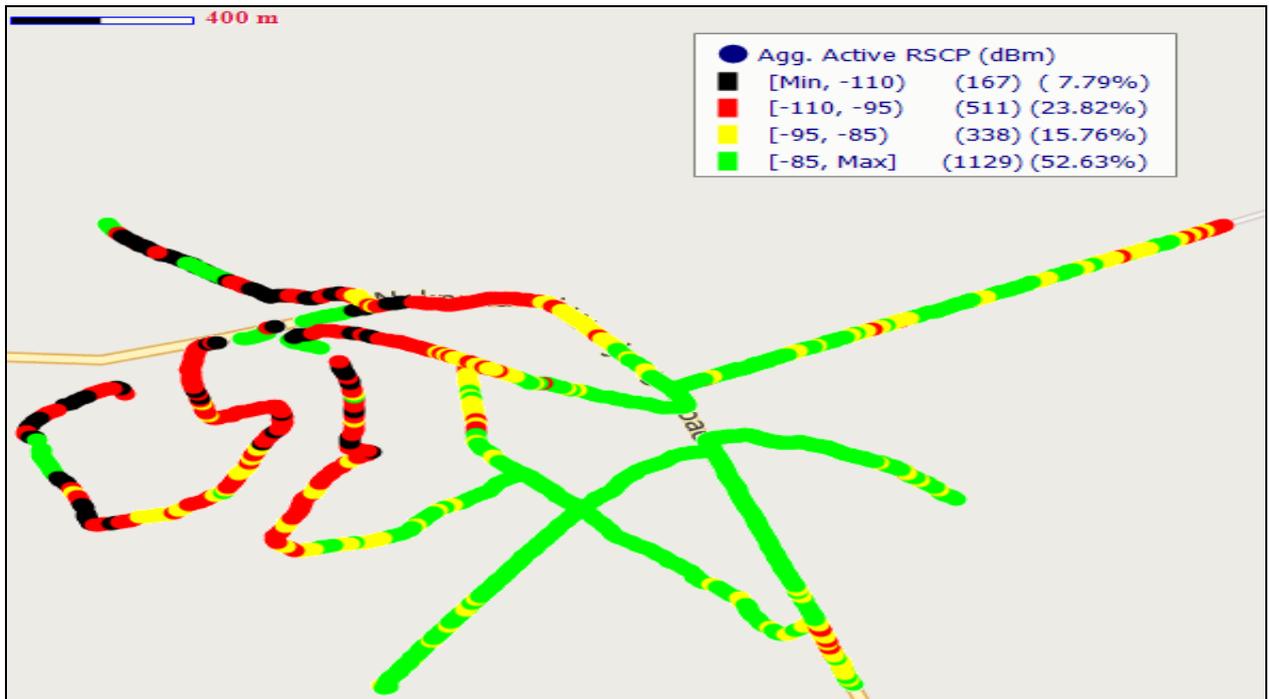
Fig. 13 - Vodafone 3G Coverage Map, Bunkpurugu - August 2016



Remarks: Good 3G coverage at Bunkpurugu

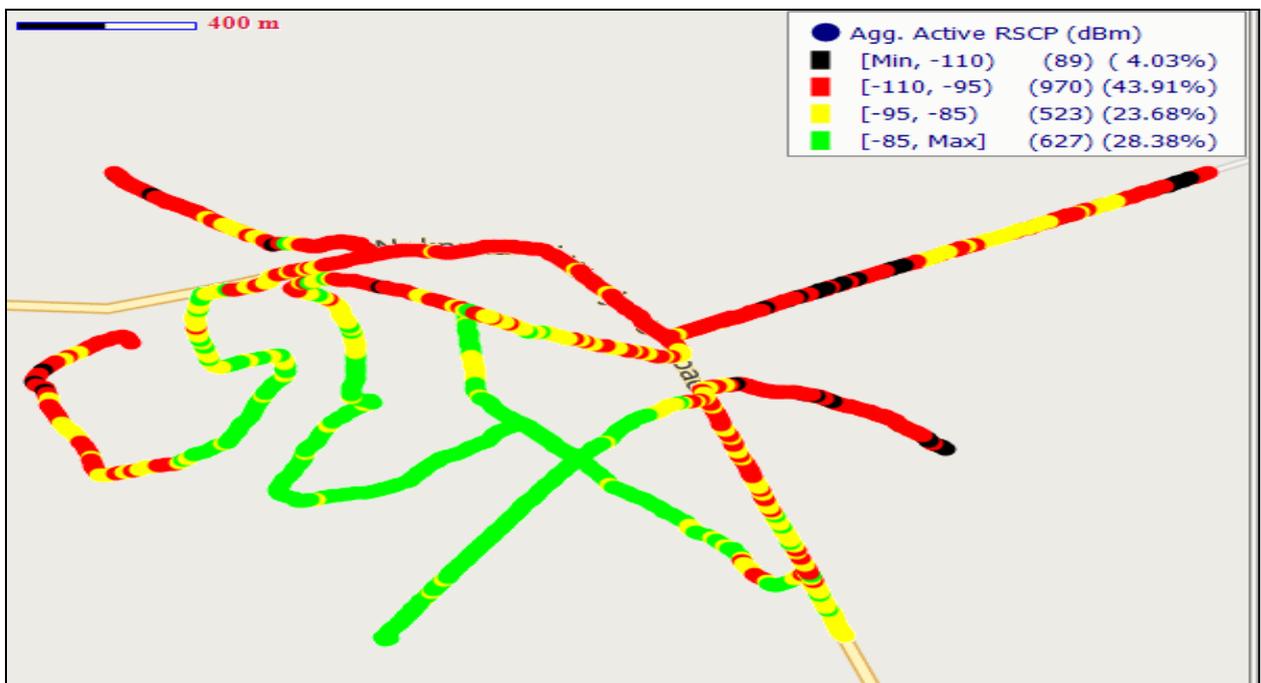
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**Fig. 14 – Tigo 3G Coverage Plot- Bunkpurugu august 2016**



**Remarks: Fair 3G coverage, but improvement is needed at areas such as the District Assembly, Hospital and Police Station.**

**Fig. 15 - Airtel 3G Coverage Map, Bunkpurugu - August 2016**

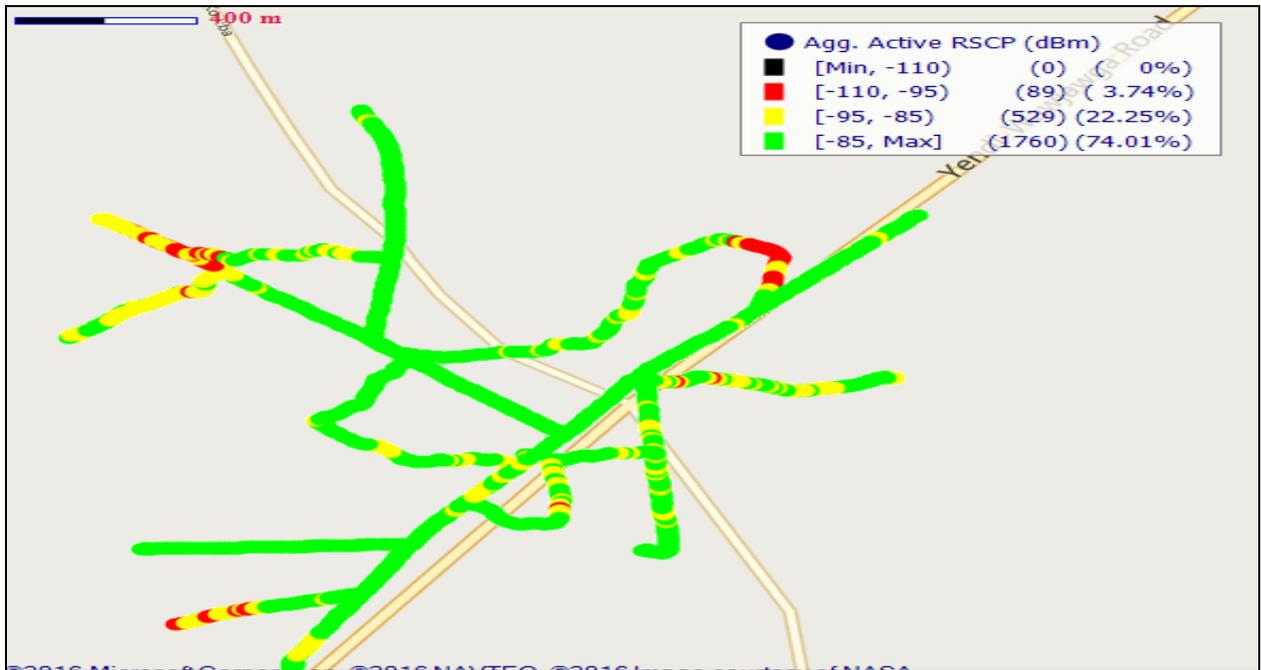


**Remarks: Fair 3G coverage in Bunkpurugu with improvement needed at Rabito Clinic, District Assembly, Market and Hospital**

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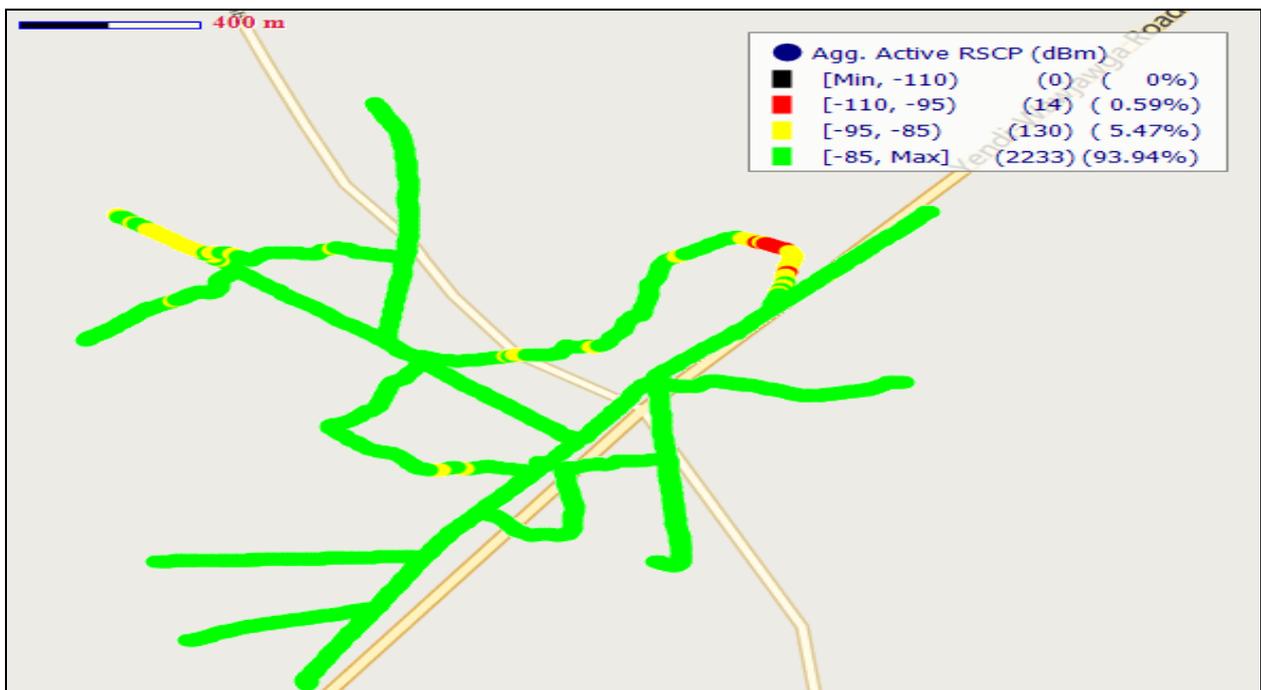
**COVERAGE AT CHEREPONI**

**Fig. 16 -MTN 3G Coverage Plot- Chereponi – August 2016**



**Remarks: Good 3G coverage with improvement needed at Chereponi Senior High and St. Brigid's Catholic Church.**

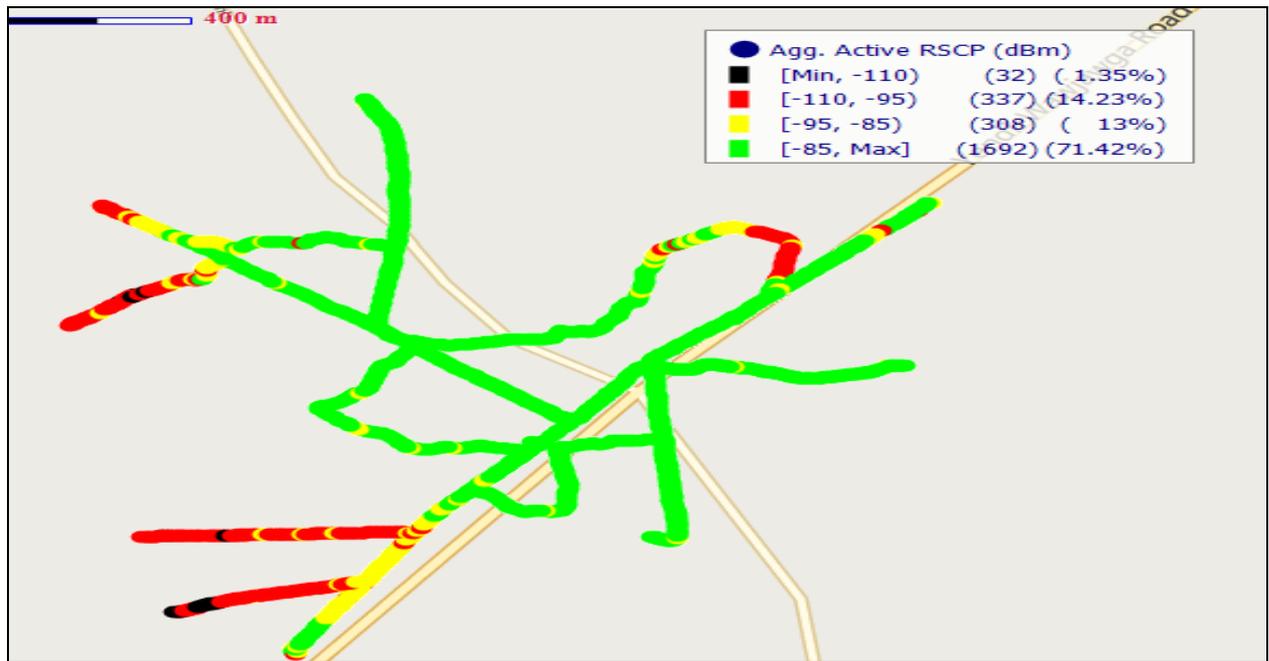
**Fig.17 - Vodafone 3G Coverage Plot- Chereponi – August 2016**



**Remarks: Good 3G coverage at Chereponi.**

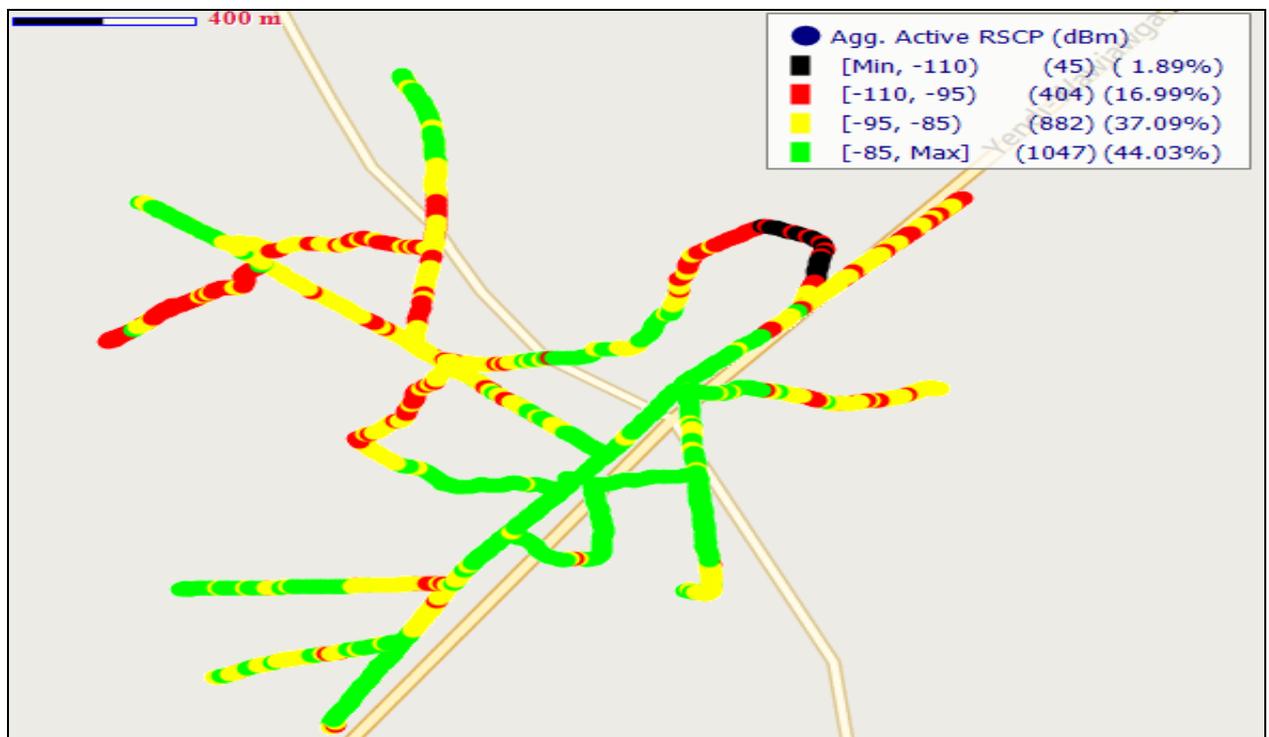
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**Fig. 18– Tigo 3G Coverage Plot- Chereponi – August 2016**



**Remarks:** Good 3G coverage with improvement required at Chereponi Senior High School, Chereponi Hospital and St. Brigid’s Catholic Church.

**Fig. 19 – Airtel 3G Coverage Plot- Chereponi – August 2016**

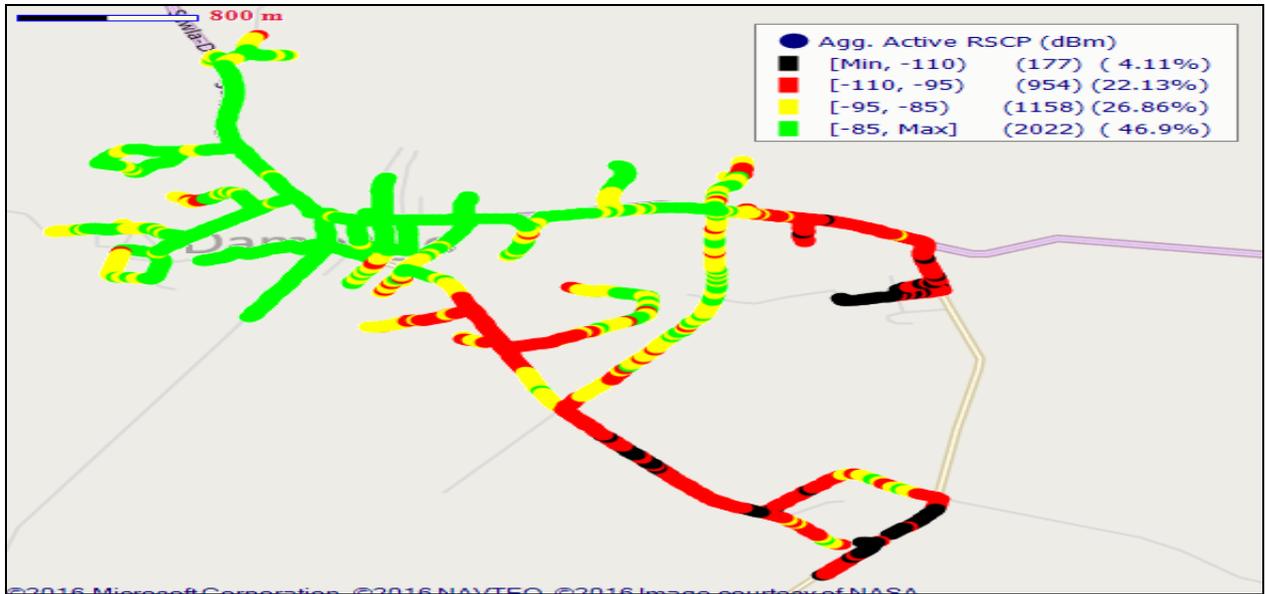


**Remarks:** Fair 3G coverage in Chereponi. However, improvement is required at St. Brigid’s Catholic Church, Chereponi Senior High, Market and Sikafuoambantem

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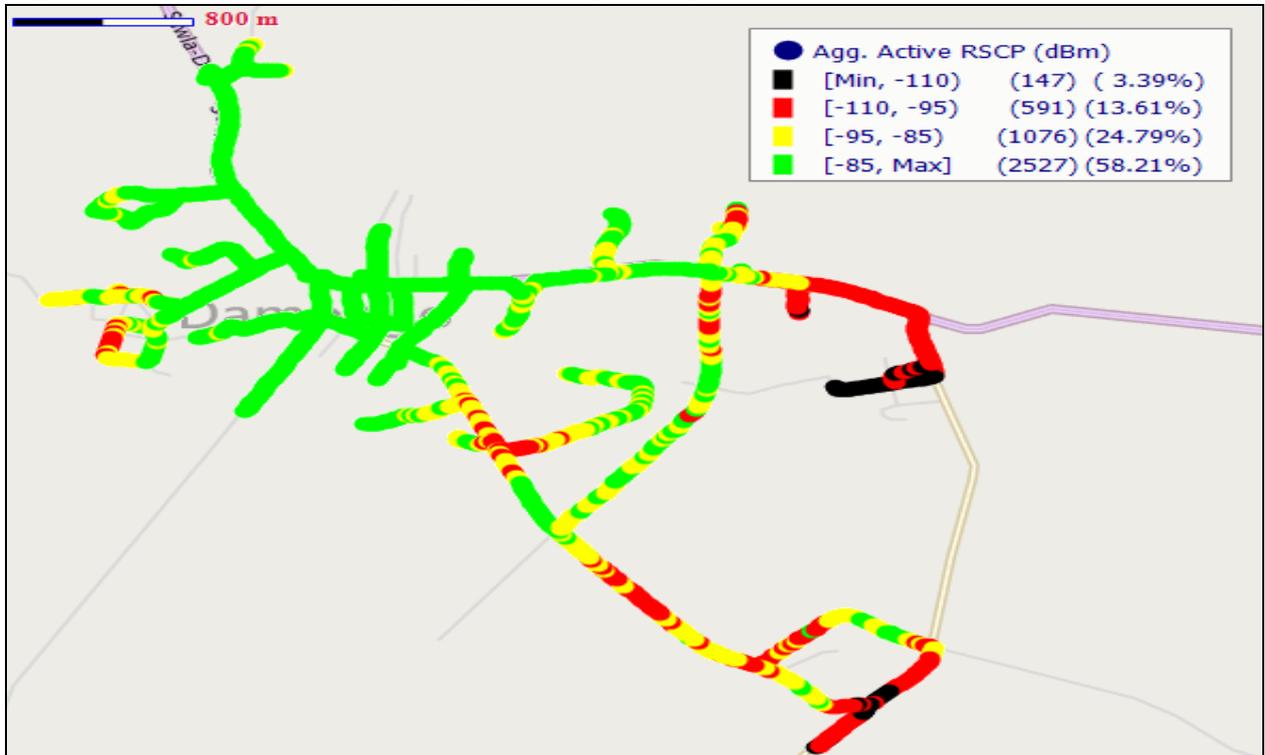
**COVERAGE AT DAMONGO**

**Fig. 20 - MTN 3G Coverage Map, Damongo - August 2016**



**Remarks:** Fair 3G coverage across Damongo with improvement required at Canteen, West Gonja Hospital and Catholic Guest House.

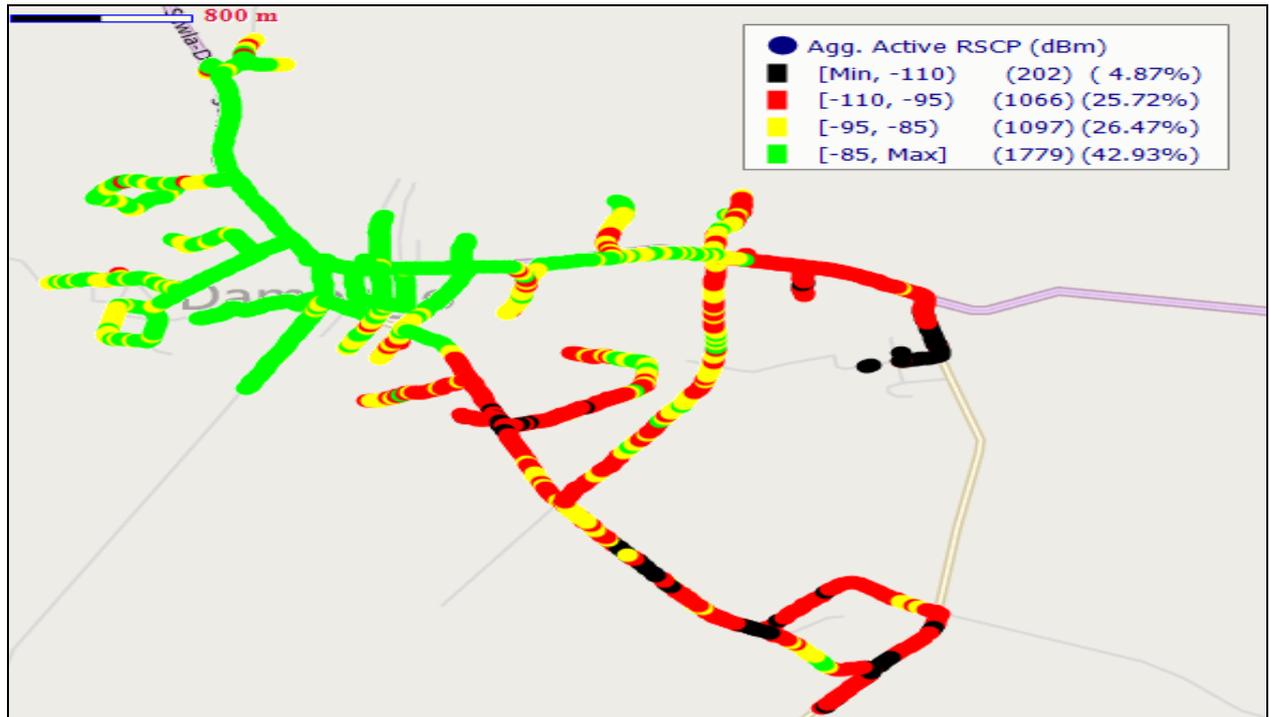
**Fig. 21 - Vodafone 3G Coverage Map, Damongo – August -2016**



**Remarks:** Remarks: Good 3G coverage in Damongo with improvement needed at Canteen, Damongo Senior High School and Catholic Guest House.

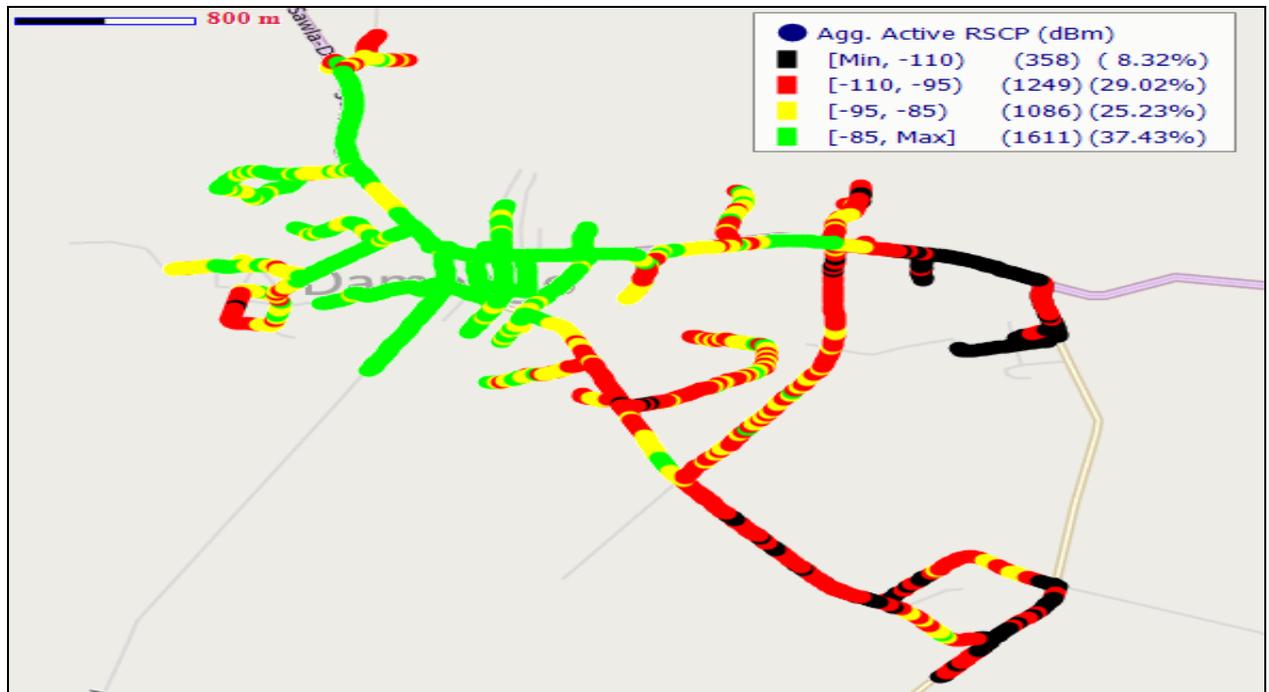
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**Fig. 22 - Tigo 3G Coverage Map, Damongo -August 2016**



**Remarks:** Fair 3G coverage; however improvement is needed at Canteen, West Gonja Hospital, Sabo Zongo and Catholic Guest House.

**Fig. 23 - Airtel 3G Coverage Map, Damongo -August 2016**

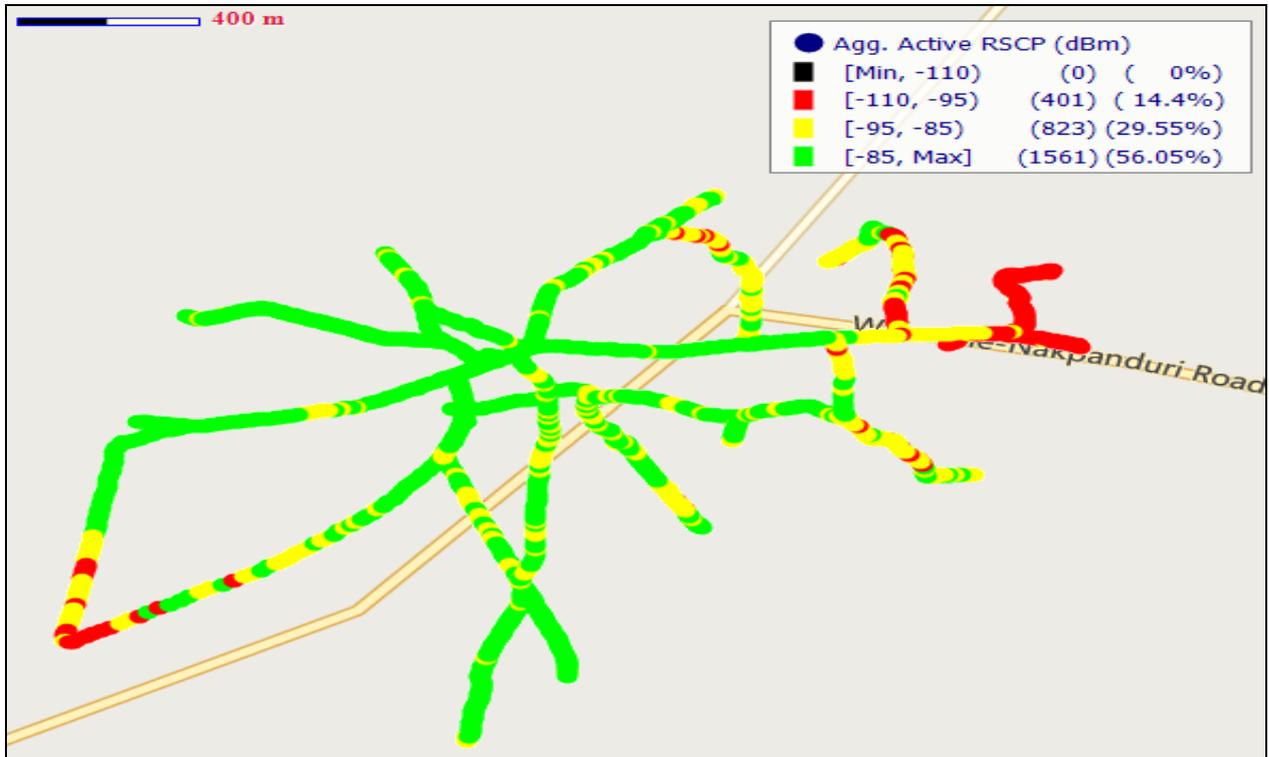


**Remarks:** Fair 3G coverage at Damongo. However, areas such as Canteen, Catholic Guest House, Agric College and West Gonja Hospital need improvement

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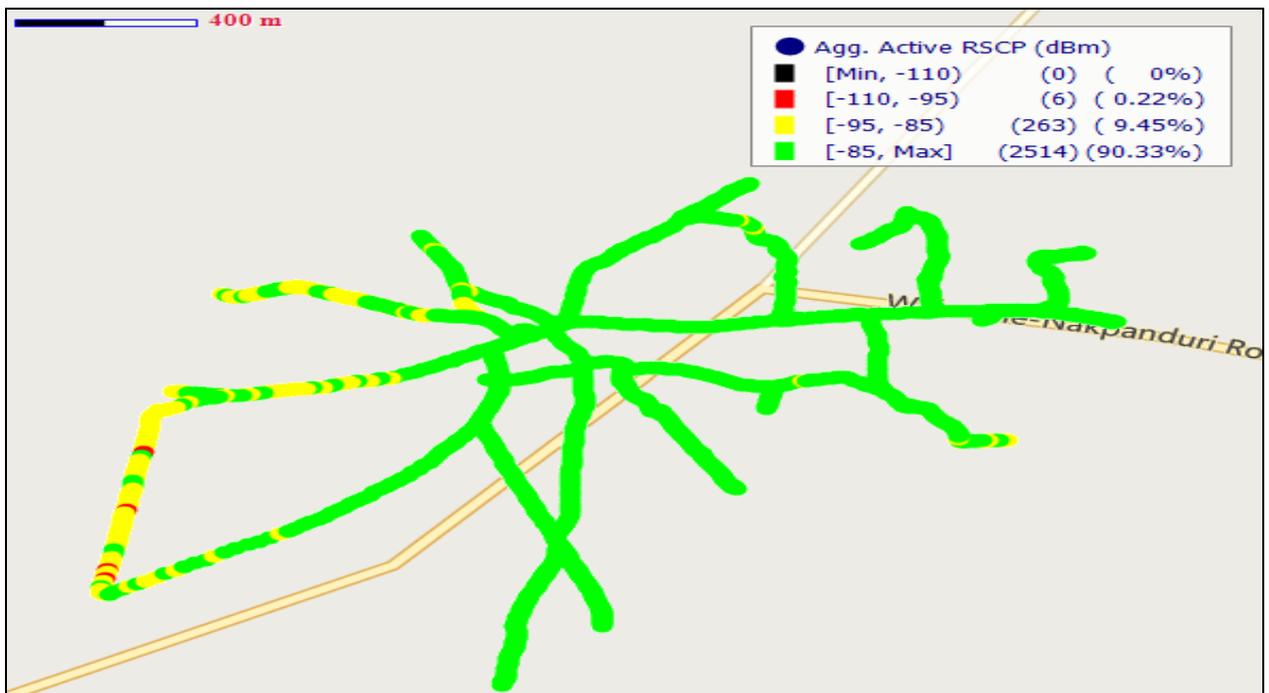
**COVERAGE AT GAMBAGA**

**Fig. 24 - MTN 3G Coverage Map, Gambaga- August 2016**



Remarks: Good 3G coverage within Gambaga, but improvement is required at the District Assembly and Gaagbini.

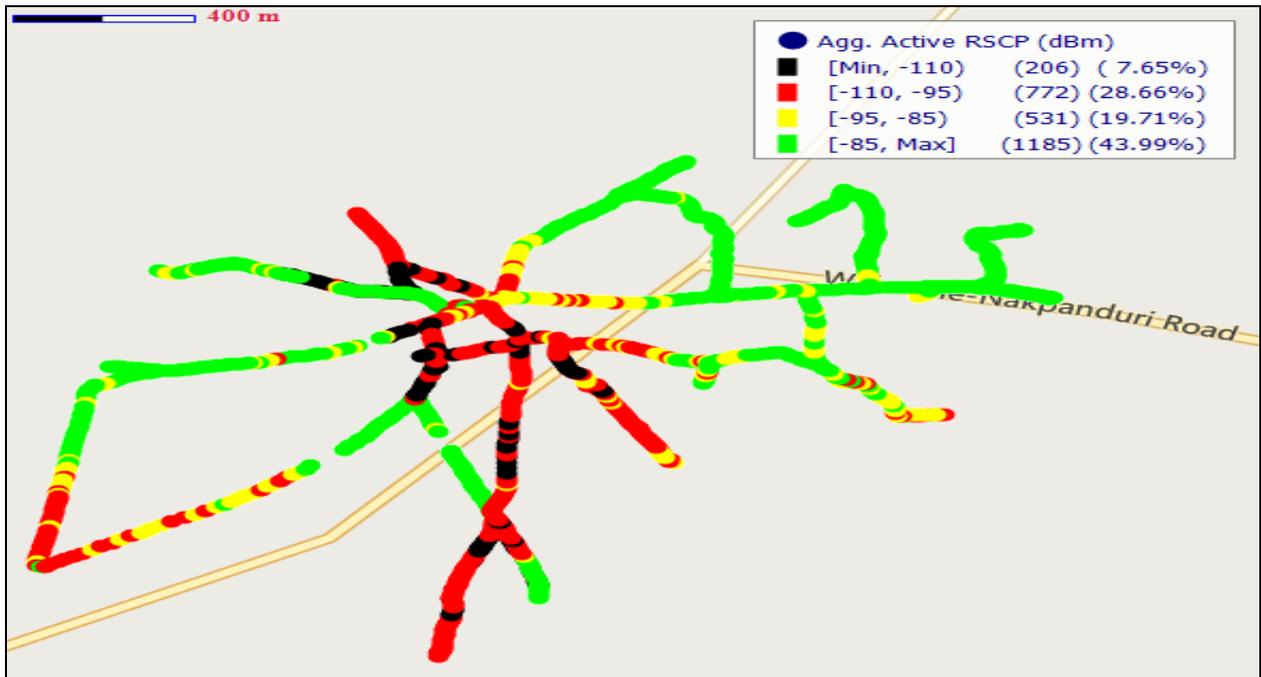
**Fig. 25 - Vodafone 3G Coverage Map, Gambaga- August 2016**



Remarks: Good 3G coverage at Gambaga.

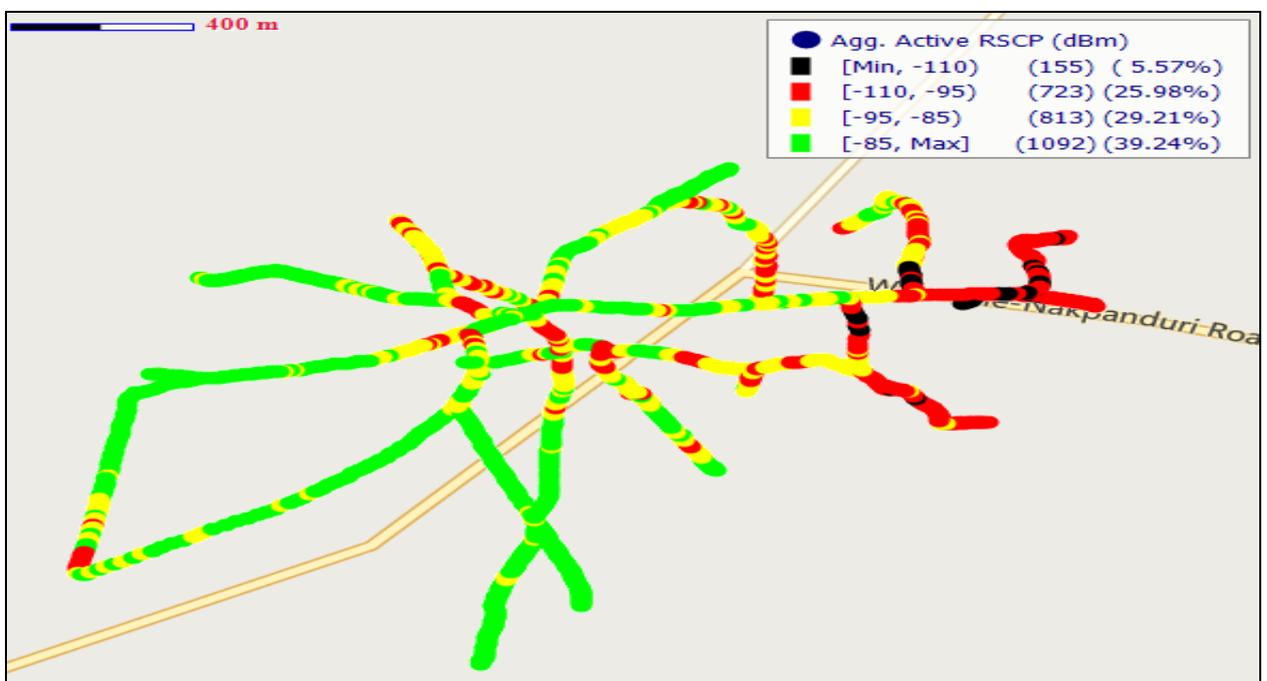
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**Fig. 26- Tigo 3G Coverage Map, Gambaga- August 2016**



**Remarks:** Fair 3G coverage across Gambaga; however improvement is required at Lorry Station, Sibefong, Imamfong and Gaagbini.

**Fig. 27 - Airtel 3G Coverage Map, Gambaga- August 2016**

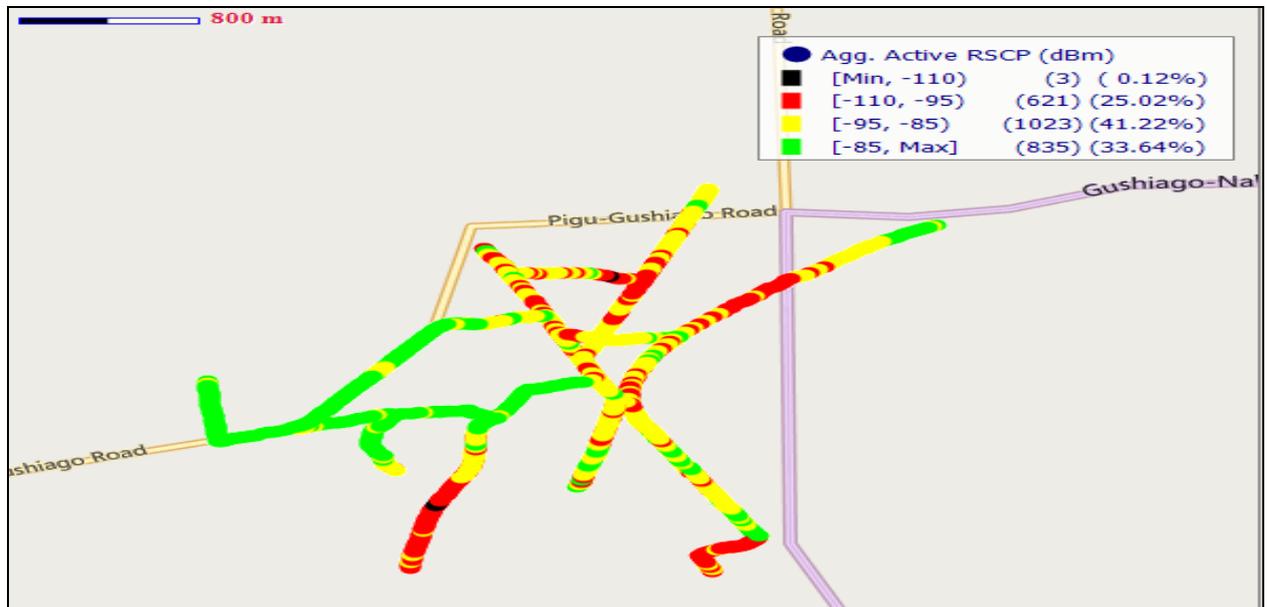


**Remarks:** Fair 3G coverage in Gambaga with improvement required at the District Assembly, Imamfong and Norrip Guest House.

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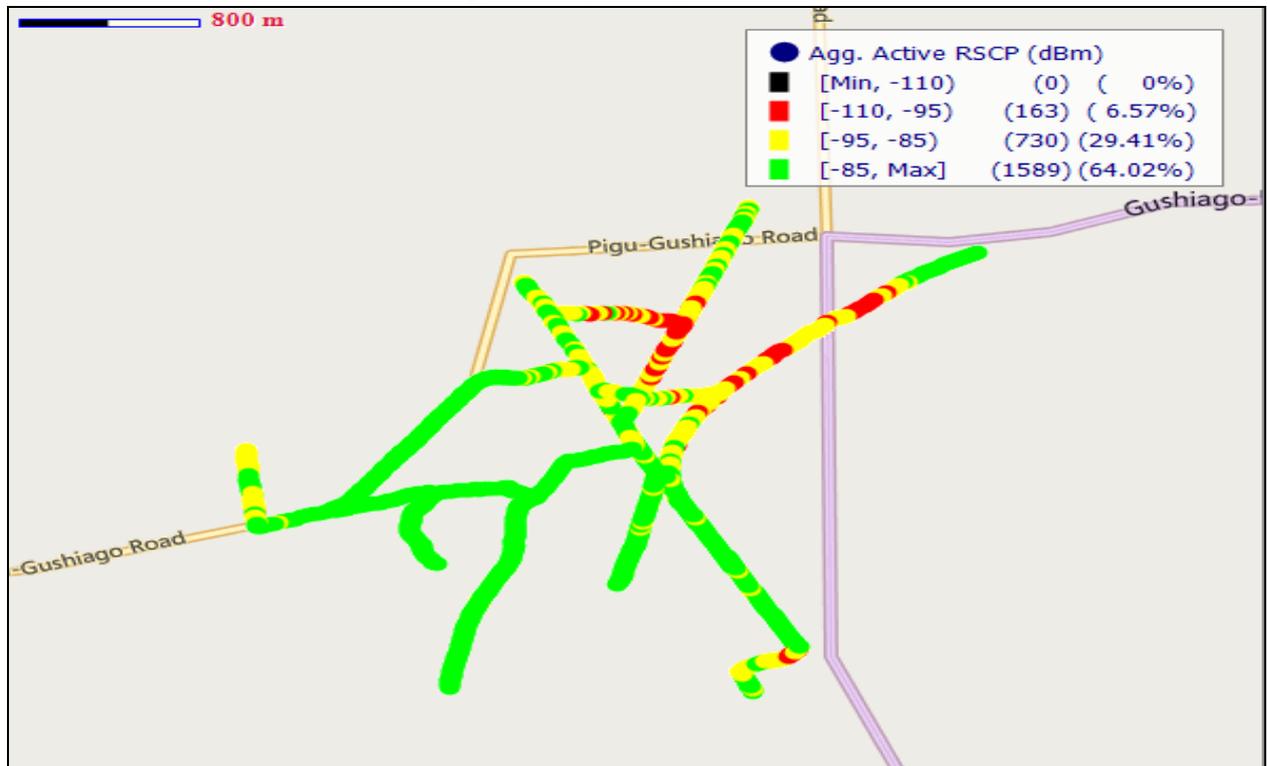
**COVERAGE AT GUSHEGU**

**Fig. 28 – MTN 3G Coverage Map, Gushegu- August 2016**



**Remarks:** Fair 3G coverage at Gushegu; however, improvement is required across the entire Gushegu Township.

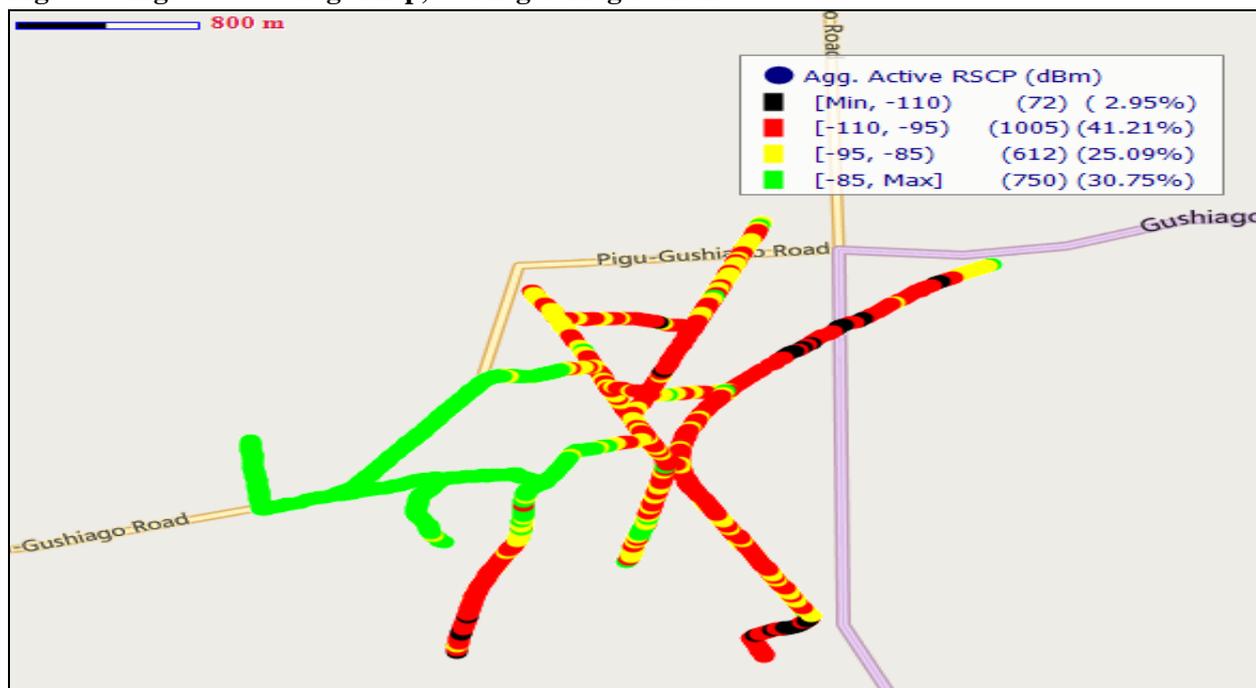
**Fig. 29 - Vodafone 3G Coverage Map, Gushegu - August 2016**



**Remarks:** Good 3G coverage in Gushegu with spots of poor coverage at Hospital and Eastern Corridor Hotel which require improvement

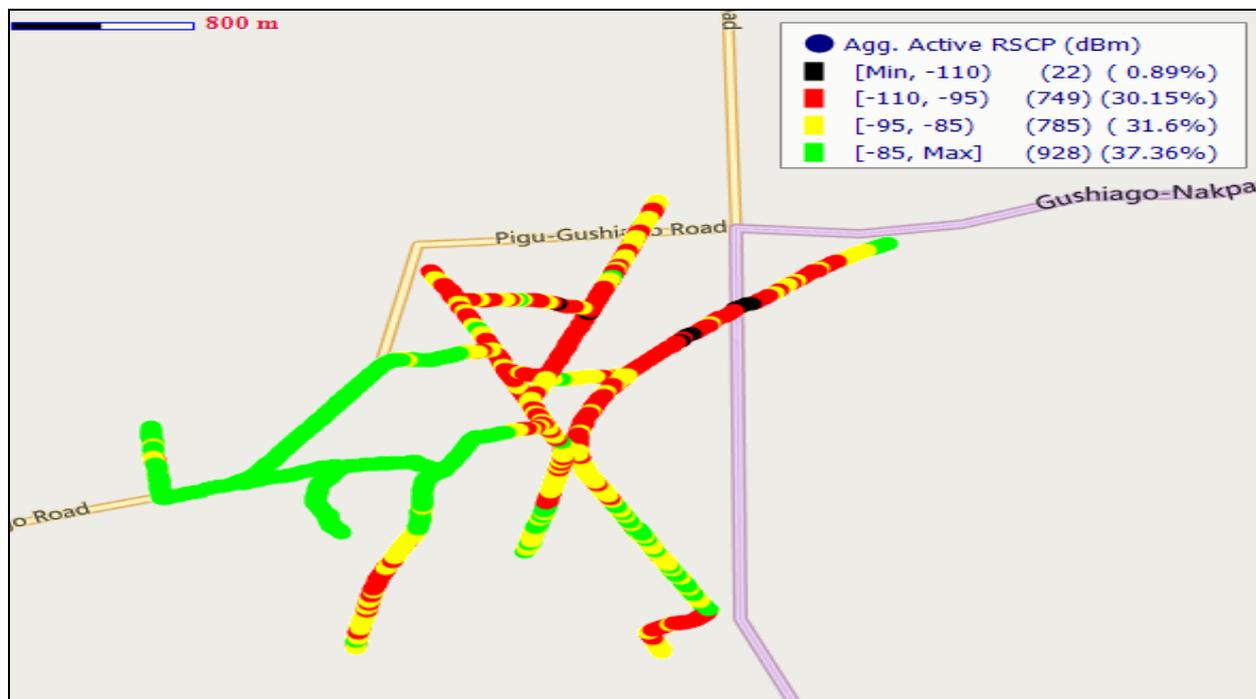
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**Fig. 30 - Tigo 3G Coverage Map, Gushegu –August-2016**



**Remarks:** Fair 3G coverage in Gushegu; however improvement is required at Eastern Corridor Hotel, Hospital and Gunayili.

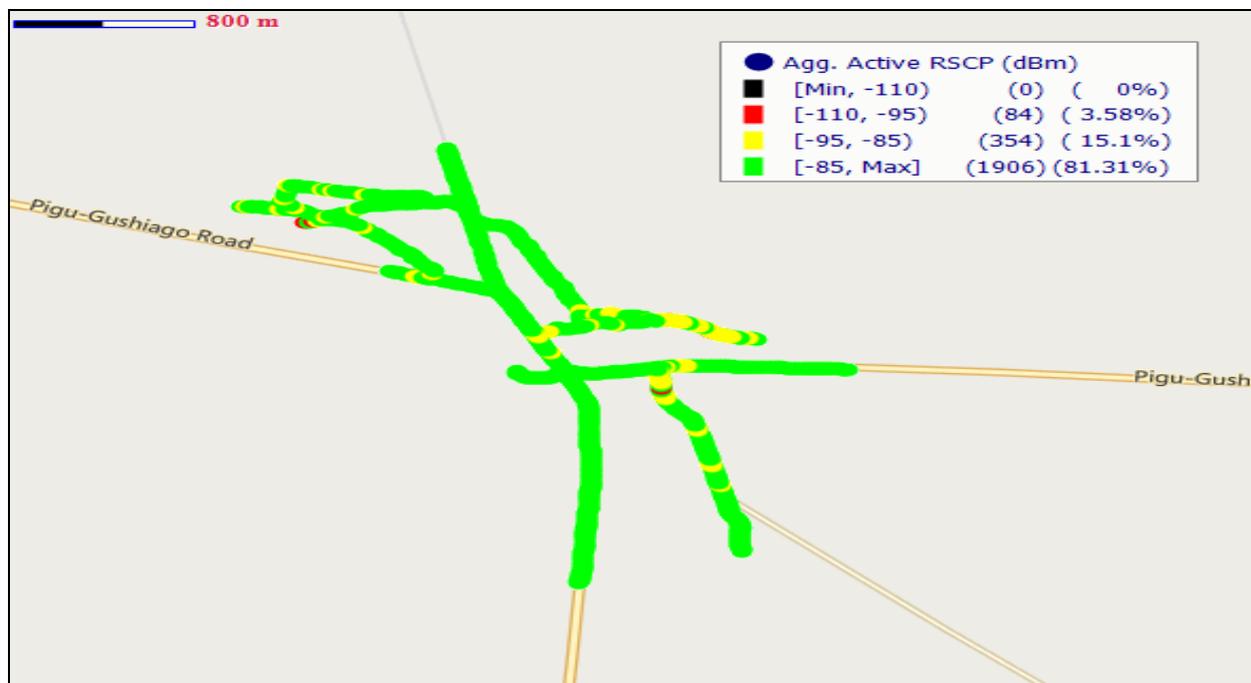
**Fig. 31 - Airtel 3G Coverage Map, Gushegu -August 2016**



**Remarks:** Fair 3G coverage in Gushegu with improvement required at Eastern Corridor Hotel, Gushegu Hospital and Lorry Station.

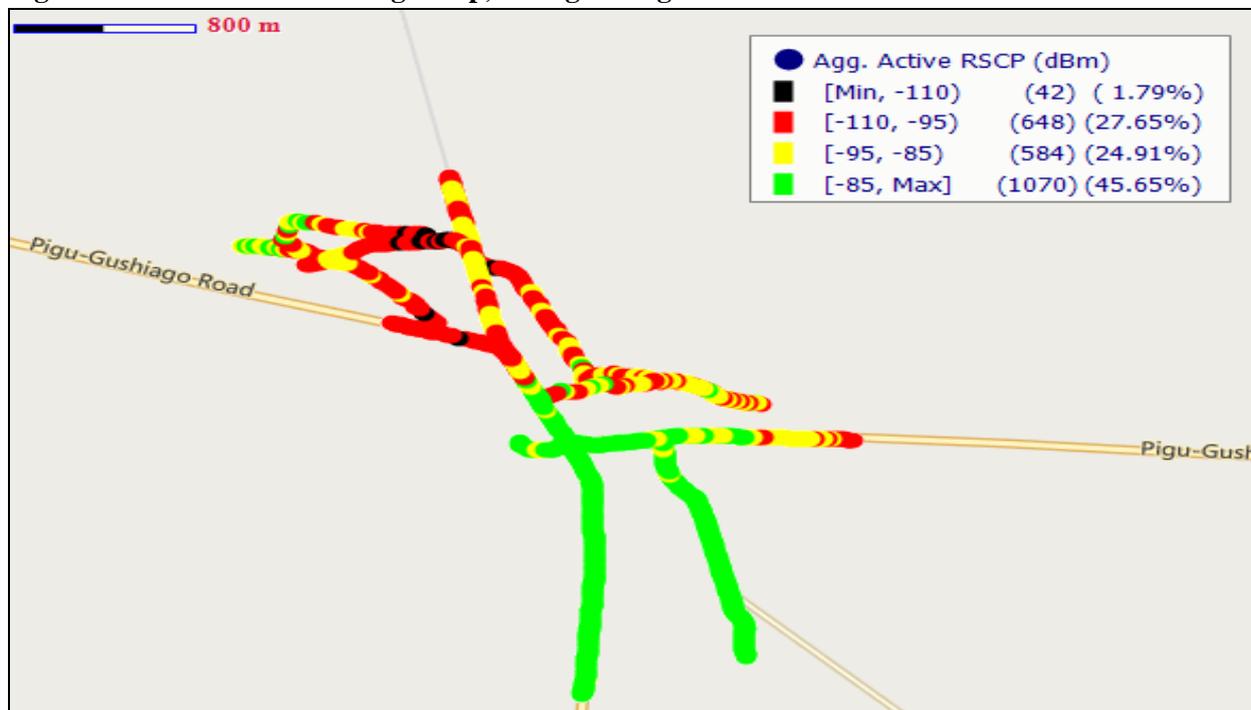
**COVERAGE AT KARAGA**

Fig. 32 - MTN 3G Coverage Map, Karaga - August 2016



Remarks: Good 3G coverage at Karaga.

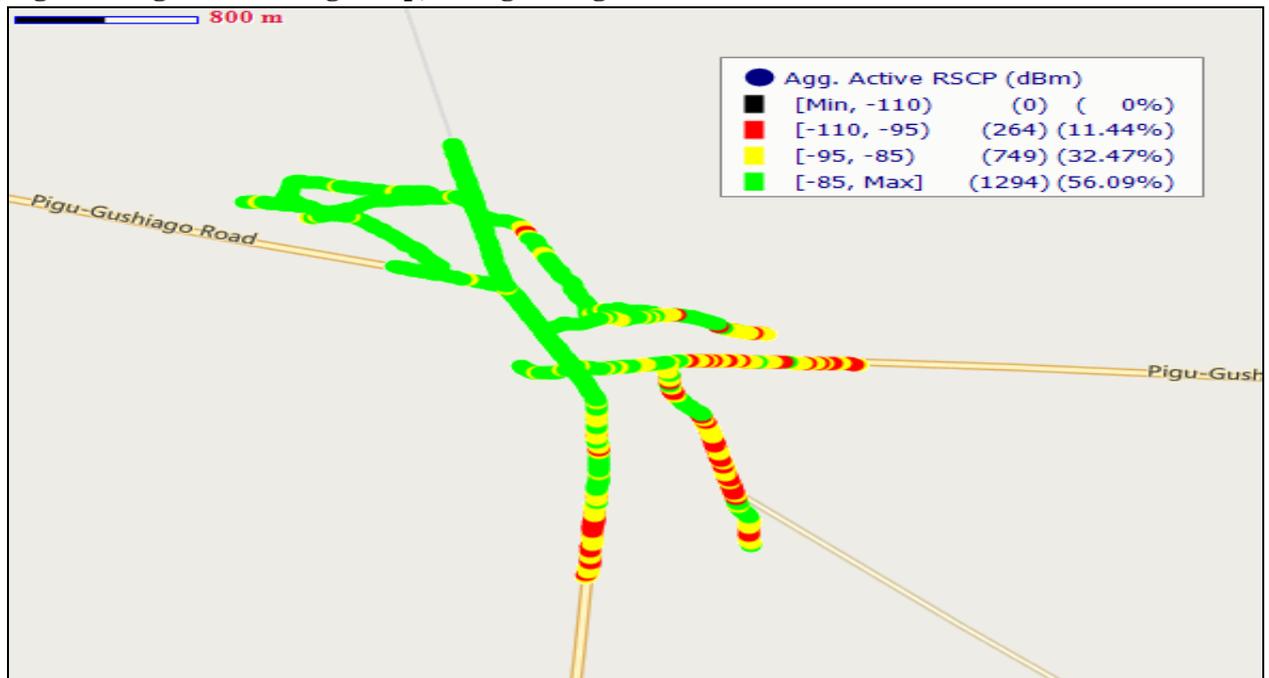
Fig. 33 - Vodafone 3G Coverage Map, Karaga - August 2016



Remarks: Good 3G coverage in Karaga but improvement is needed at District Assembly and the Palace.

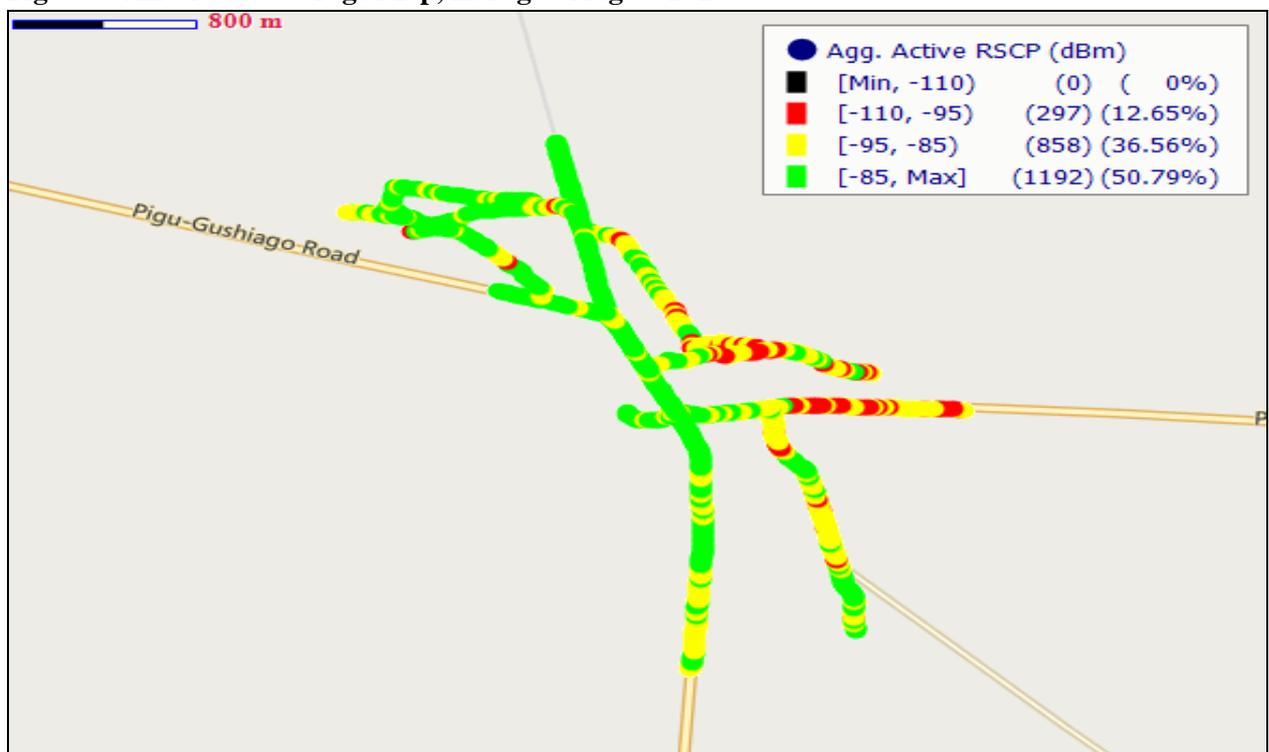
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**Fig. 34 - Tigo 3G Coverage Map, Karaga - August 2016**



**Remarks: Good 3G coverage across Karaga with spots of poor coverage at Hospital and Palace which require improvement.**

**Fig. 35 - Airtel 3G Coverage Map, Karaga - August 2016**

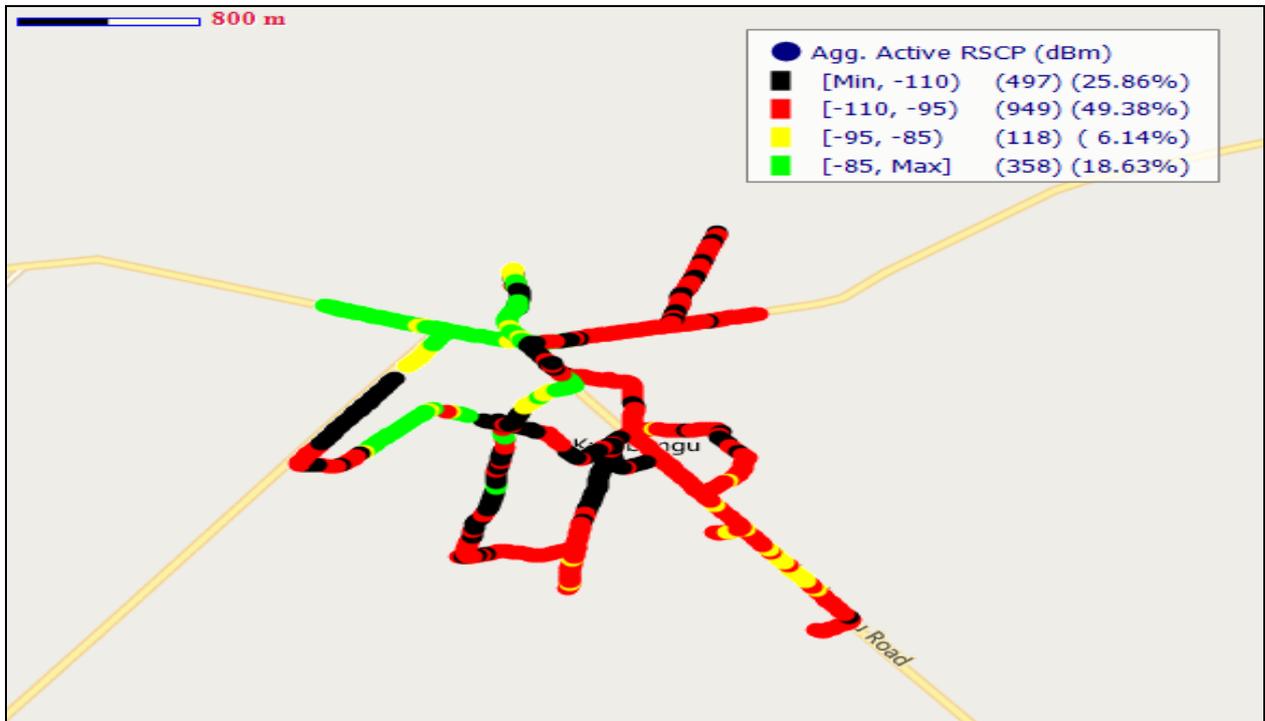


**Remarks: Fair 3G coverage in Karaga with spots of poor coverage at the Palace Area which require improvement.**

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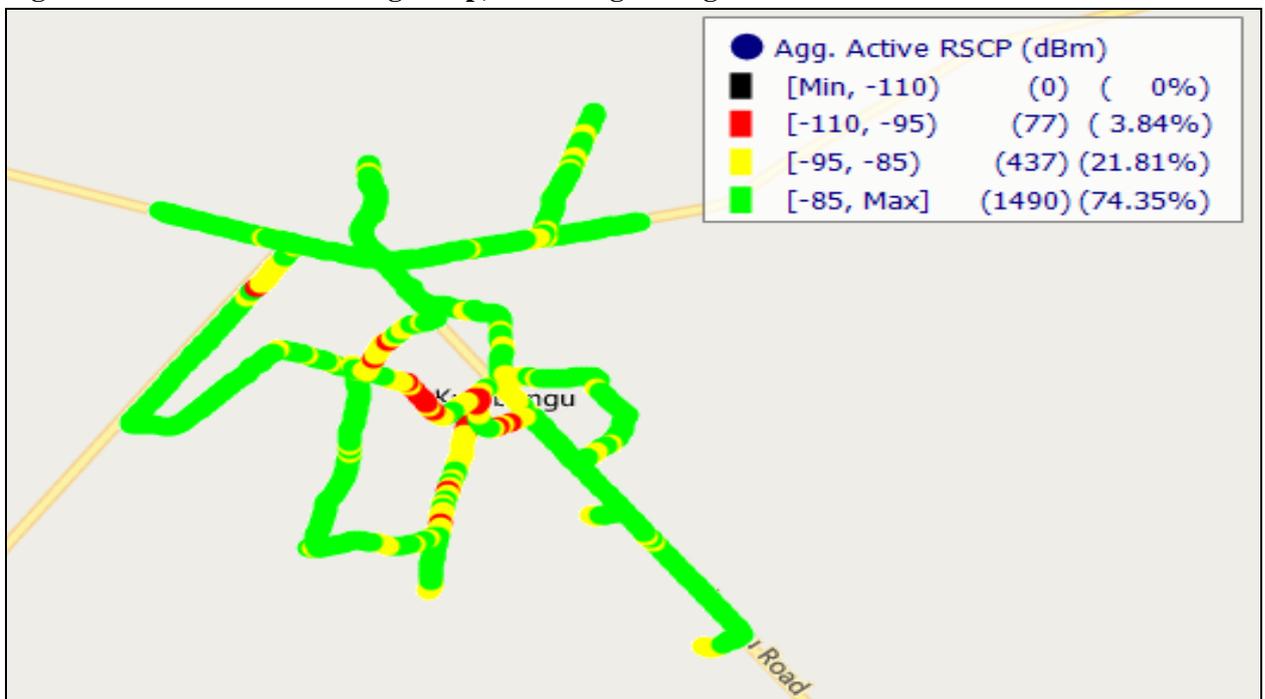
**COVERAGE AT KUMBUNGU**

**Fig. 36 - MTN 3G Coverage Map, Kumbungu - August 2016**



**Remarks: 3G coverage at Kumbungu is Non-existent. MTN must extend its 3G coverage to Kumbungu**

**Fig. 37 - Vodafone 3G Coverage Map, Kumbungu - August 2016**

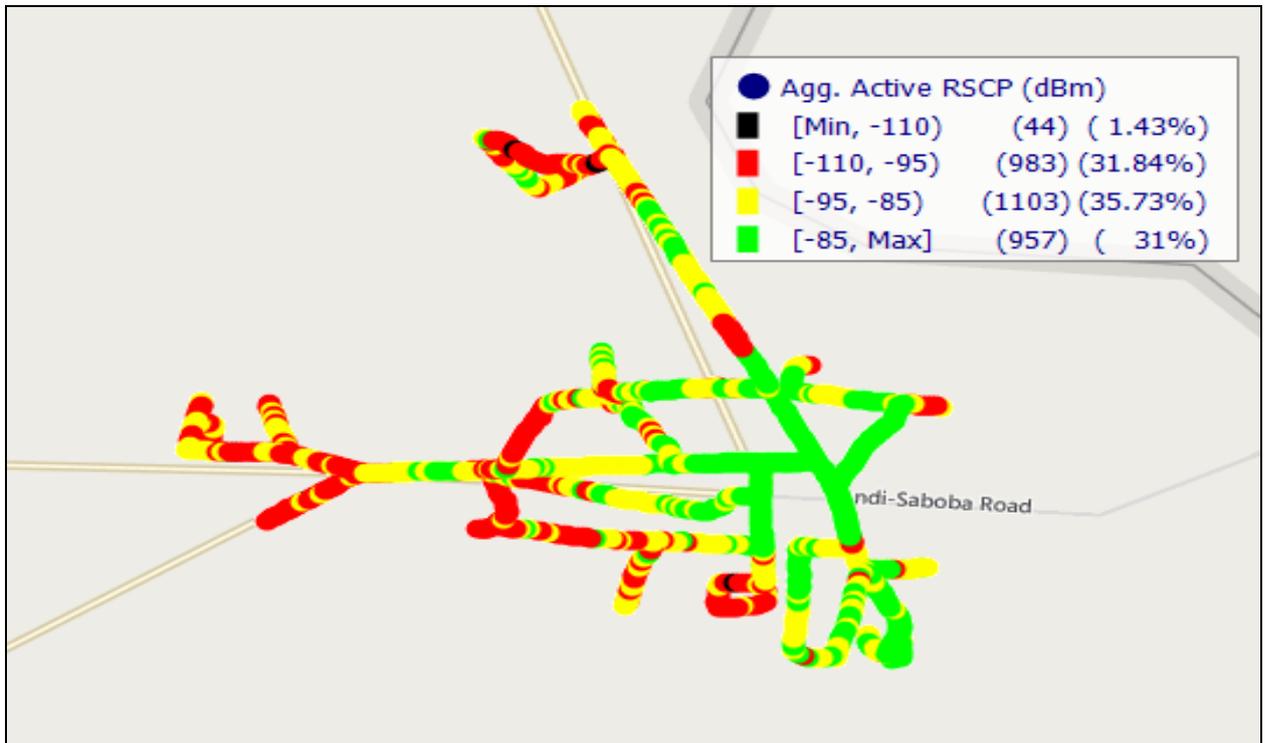


**Remarks: Good 3G coverage at Kumbungu.**

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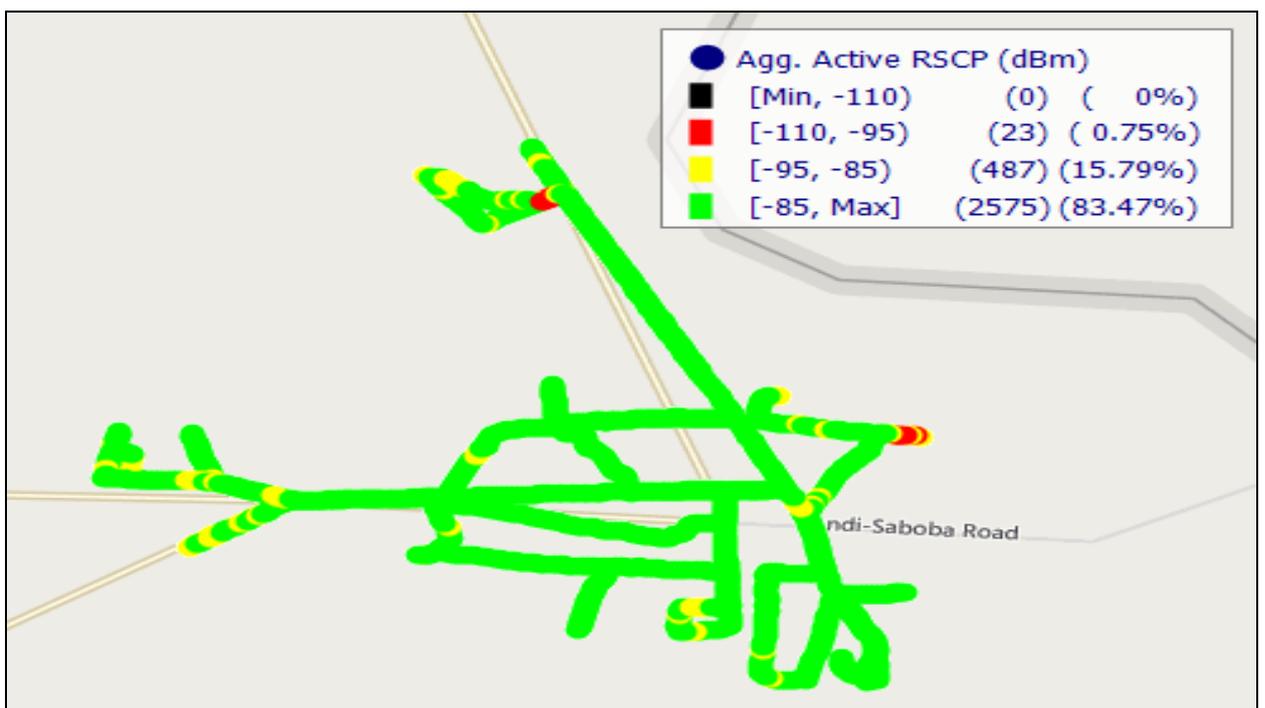
**COVERAGE AT SABOBA**

**Fig. 38 - MTN 3G Coverage Map, Saboba – August 2016**



**Remarks: Fair 3G coverage at Saboba with improvement required across the entire township.**

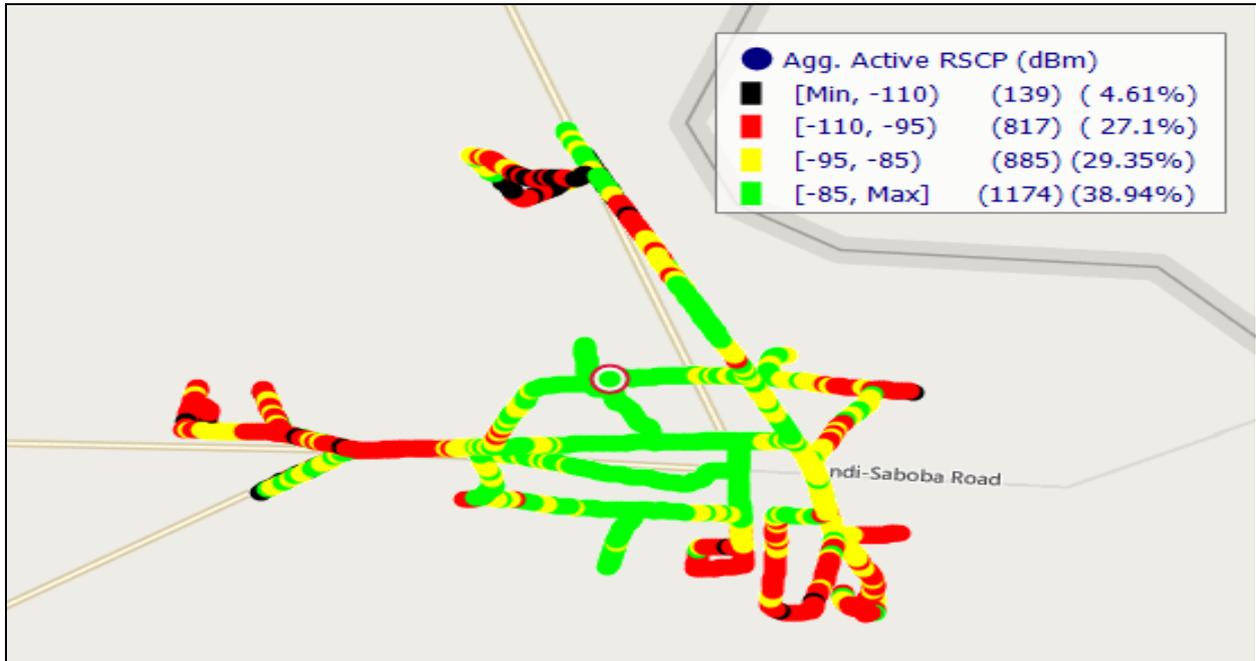
**Fig. 39 - Vodafone 3G Coverage Map, Saboba – August 2016**



**Remarks: Good 3G coverage at Saboba.**

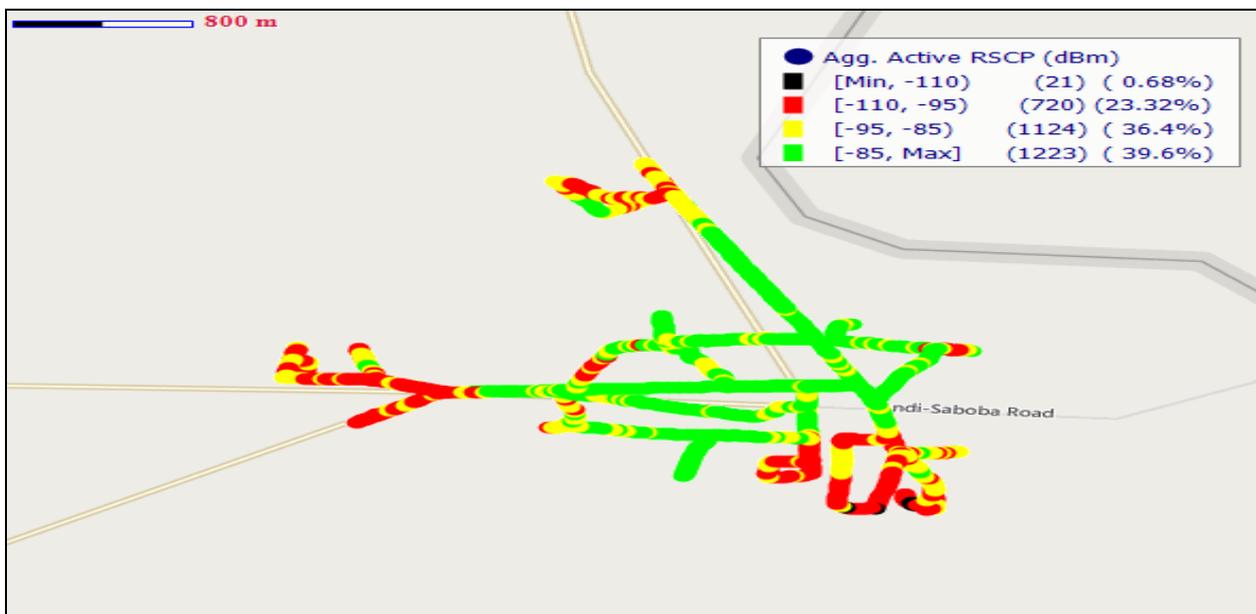
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**Fig. 40 – Tigo 3G Coverage Map, Saboba – August 2016**



**Remarks: Fair 3G coverage in Saboba but improvement is required at DCE’s Residence, Market, EP Senior High School and St. Joseph’s Technical Senior High School**

**Fig. 41 – Airtel 3G Coverage Map, Saboba – August 2016**

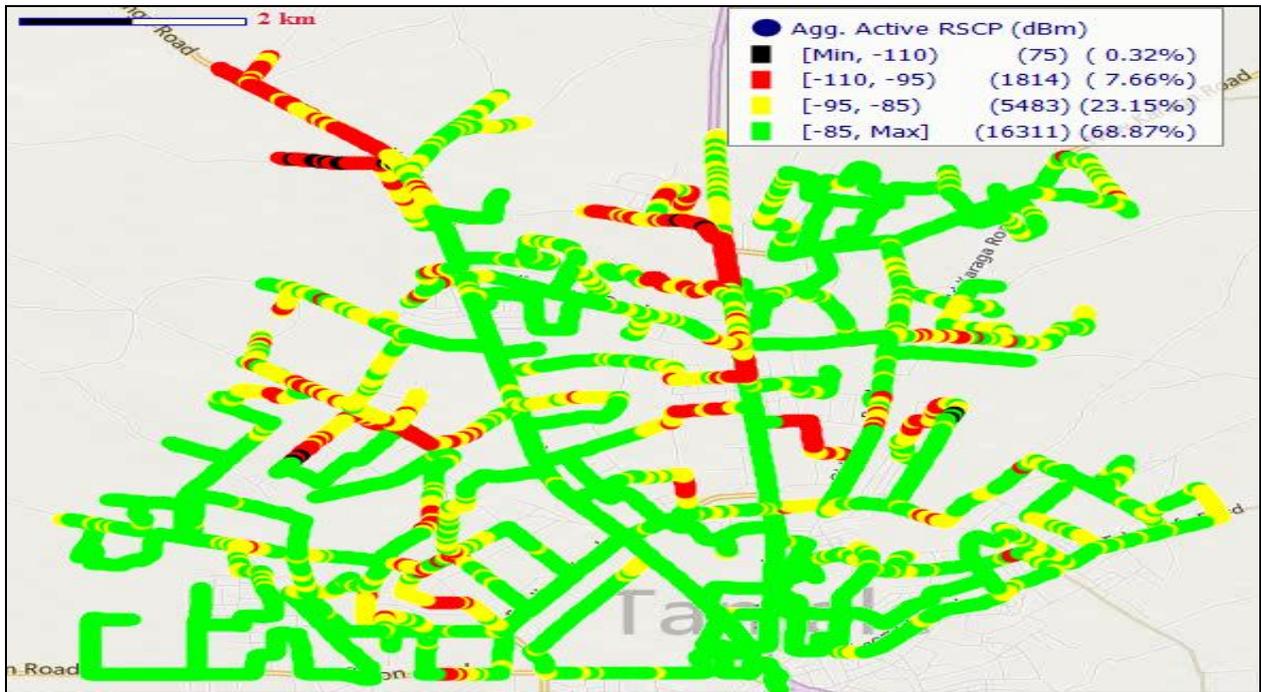


**Remarks: Fair 3G coverage in Saboba. However, improvement is required at the DCE’s Residence, EP Senior High, Market and St. Joseph’s Technical Senior High School.**

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

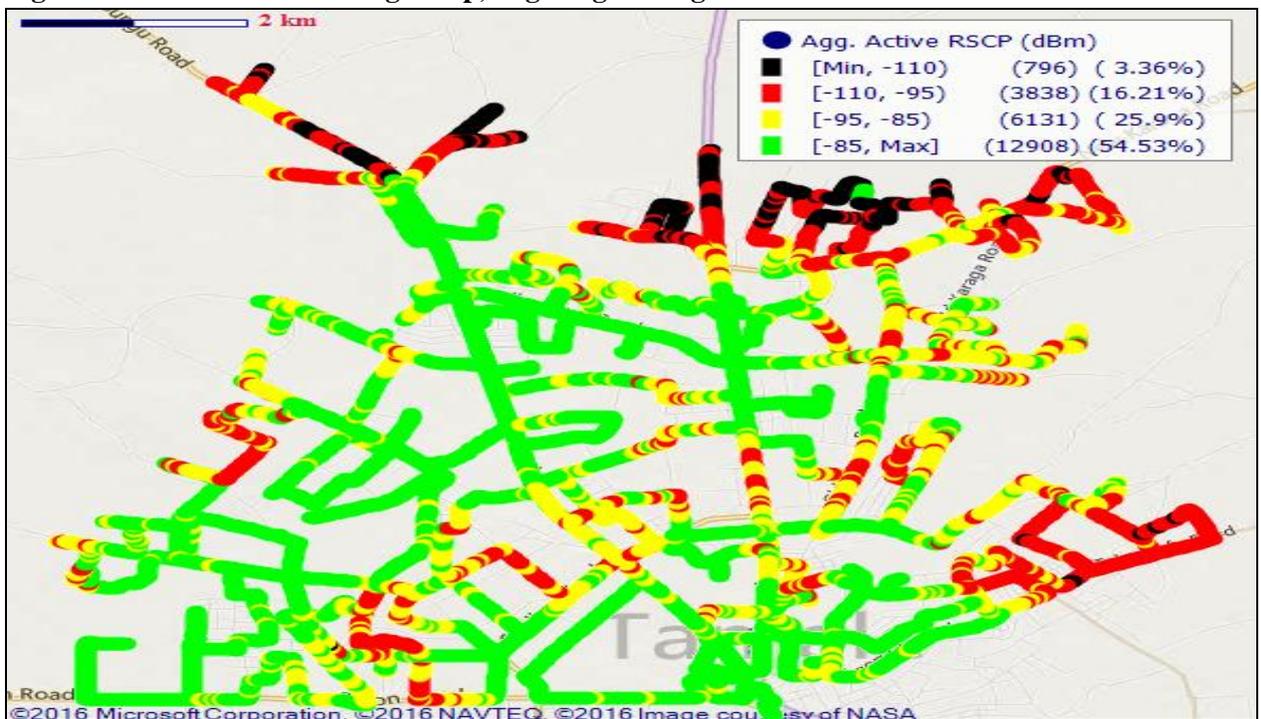
**COVERAGE AT SAGNARIGU**

**Fig. 42 – MTN 3G Coverage Map, Sagnarigu – August 2016**



**Remarks:** Good 3G coverage in Sagnarigu with spots of poor coverage at Kamina, Sagnarigu, Sonayili and Gbolo Kpalsi which need improvement

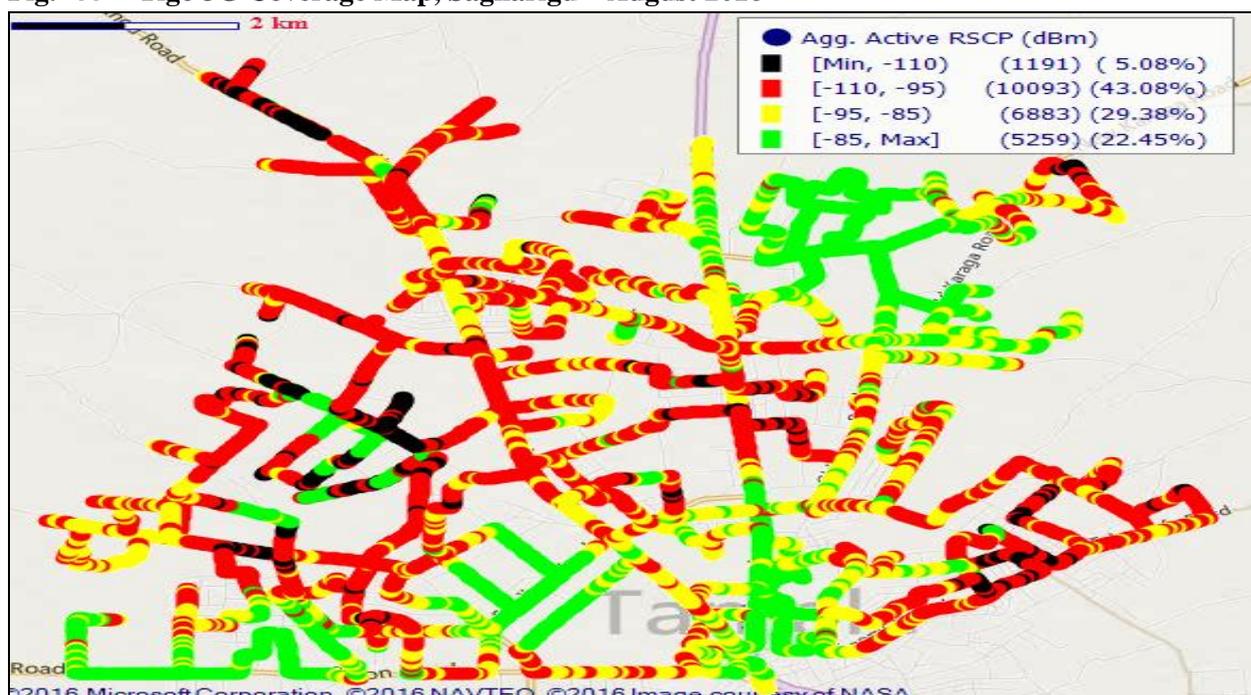
**Fig. 43 – Vodafone 3G Coverage Map, Sagnarigu – August 2016**



**Remarks:** Good 3G coverage in Sagnarigu with spots of poor coverage across the entire Sagnarigu District which requires improvement.

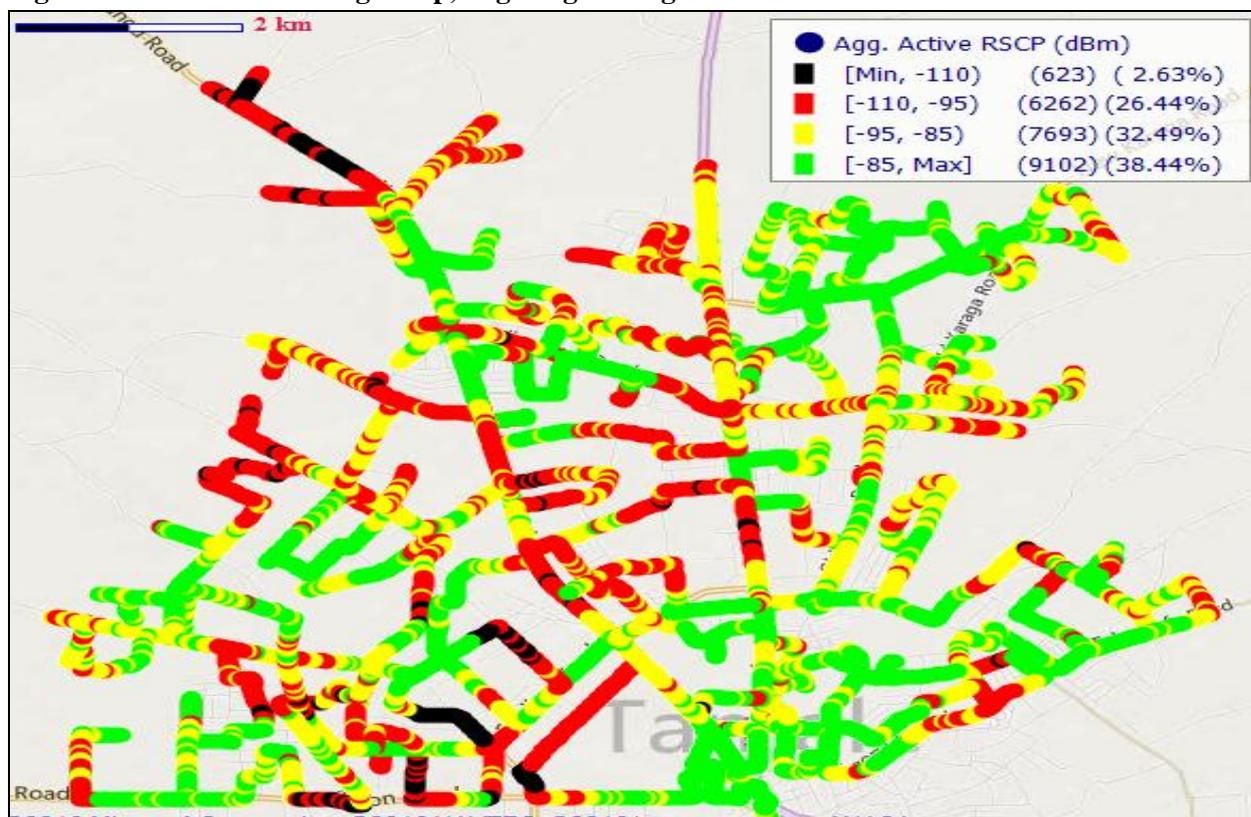
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 44 – Tigo 3G Coverage Map, Sagnarigu – August 2016**



**Remarks:** Fair 3G coverage at Sagnarigu; however improvement is required across the entire Sagnarigu District and its environs.

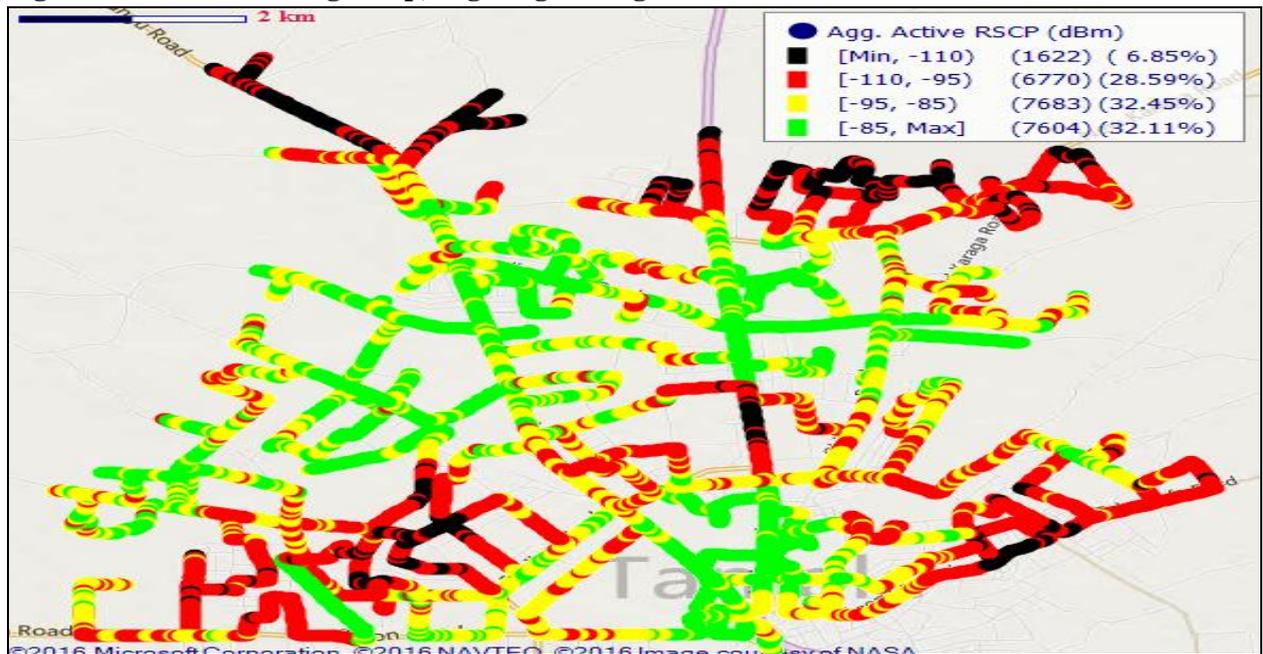
**Fig. 45 – Airtel 3G Coverage Map, Sagnarigu – August 2016**



**Remarks:** Fair 3G coverage at Sagnarigu. However, improvement is required across the entire township.

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

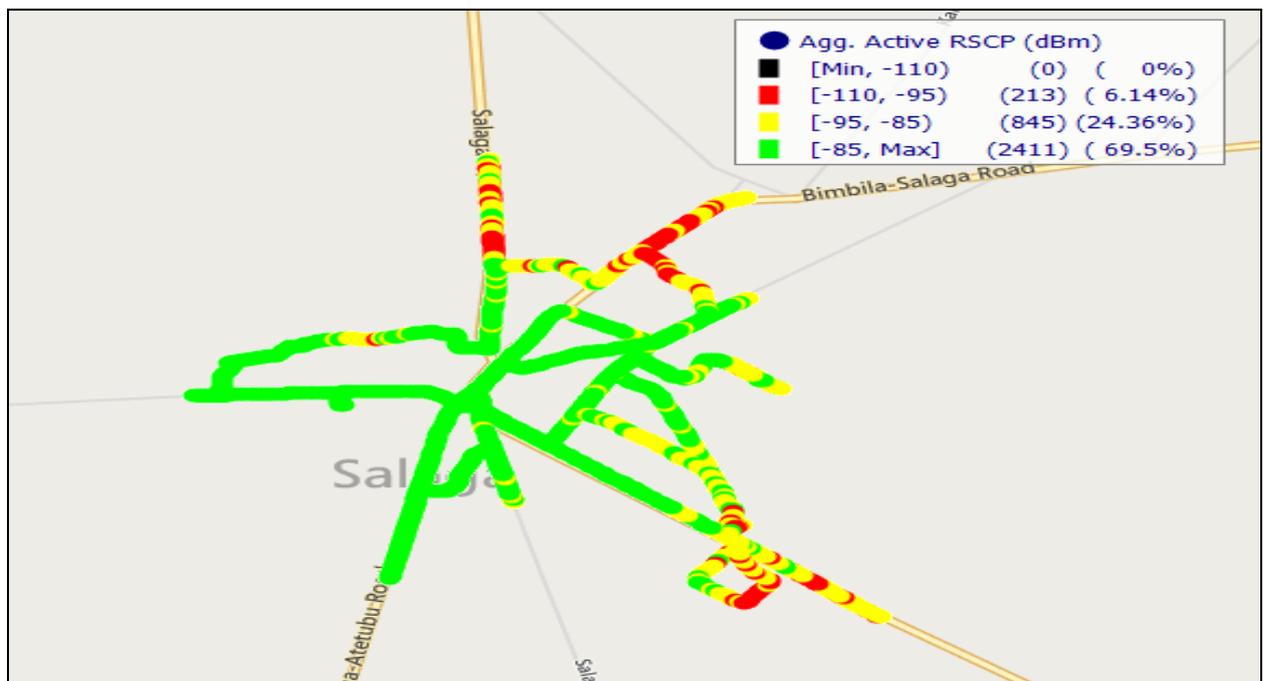
**Fig. 46 – Glo 3G Coverage Map, Sagnarigu – August 2016**



**Remarks:** Fair 3G coverage in Sagnarigu. However, improvement is required across the entire Sagnarigu District.

**COVERAGE AT SALAGA**

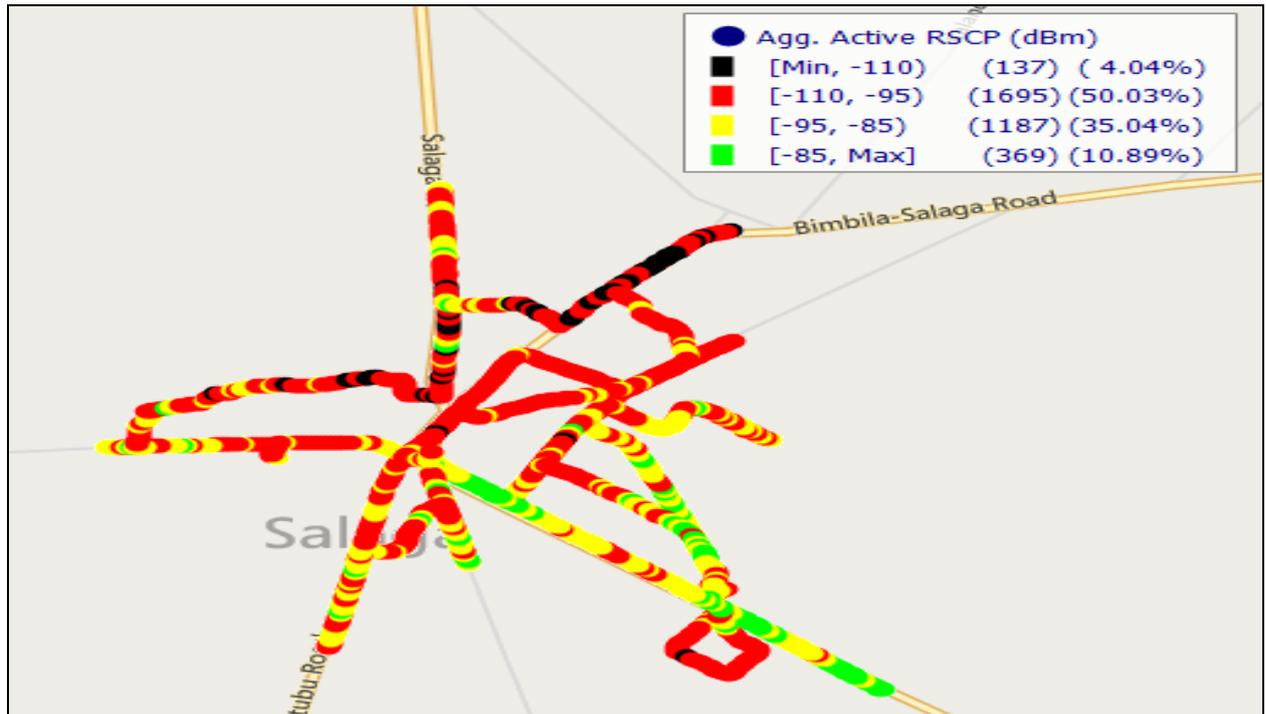
**Fig. 47 - MTN 3G Coverage Map, Salaga -August 2016**



**Remarks:** Good 3G coverage at Salaga; however, areas such as Kanyitipe, Hospital and Salaga Senior High need improvement

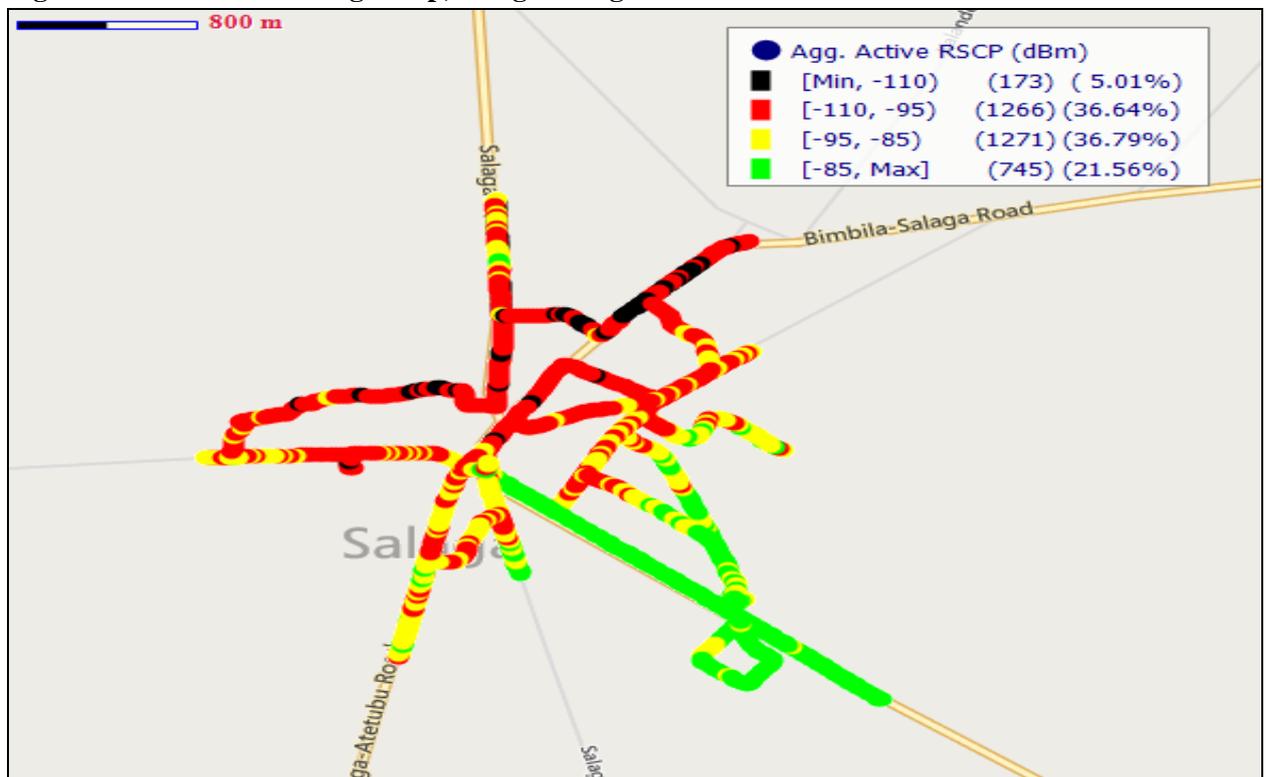
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 48 - Tigo 3G Coverage Map, Salaga – August 2016**



**Remarks:** Poor 3G coverage within Salaga. Major improvement is required across the entire Salaga Township.

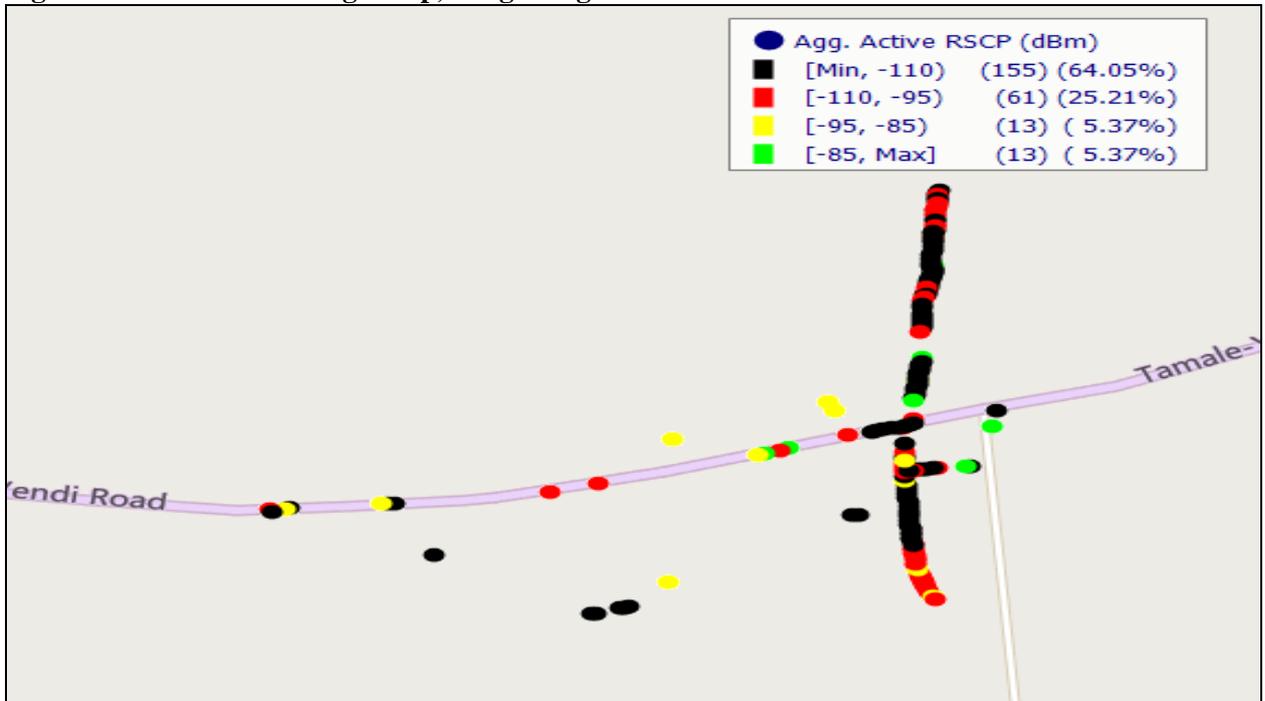
**Fig. 49 - Airtel 3G Coverage Map, Salaga – August 2016**



**Remarks:** Fair 3G coverage at Salaga with improvement needed across the entire township.

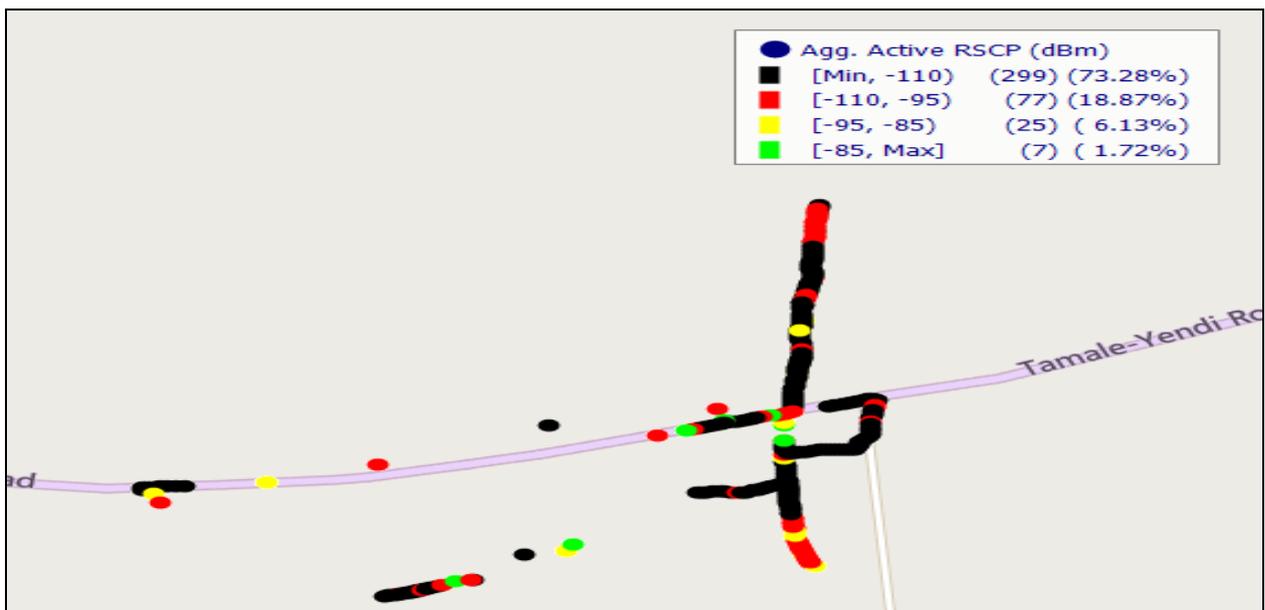
**COVERAGE AT SANG**

**Fig. 50 - MTN 3G Coverage Map, Sang - August 2016**



Remarks: 3G coverage in Sang is Non – existent. MTN needs to extend its 3G coverage to Sang.

**Fig. 51 - Vodafone 3G Coverage Map, Sang - August 2016**

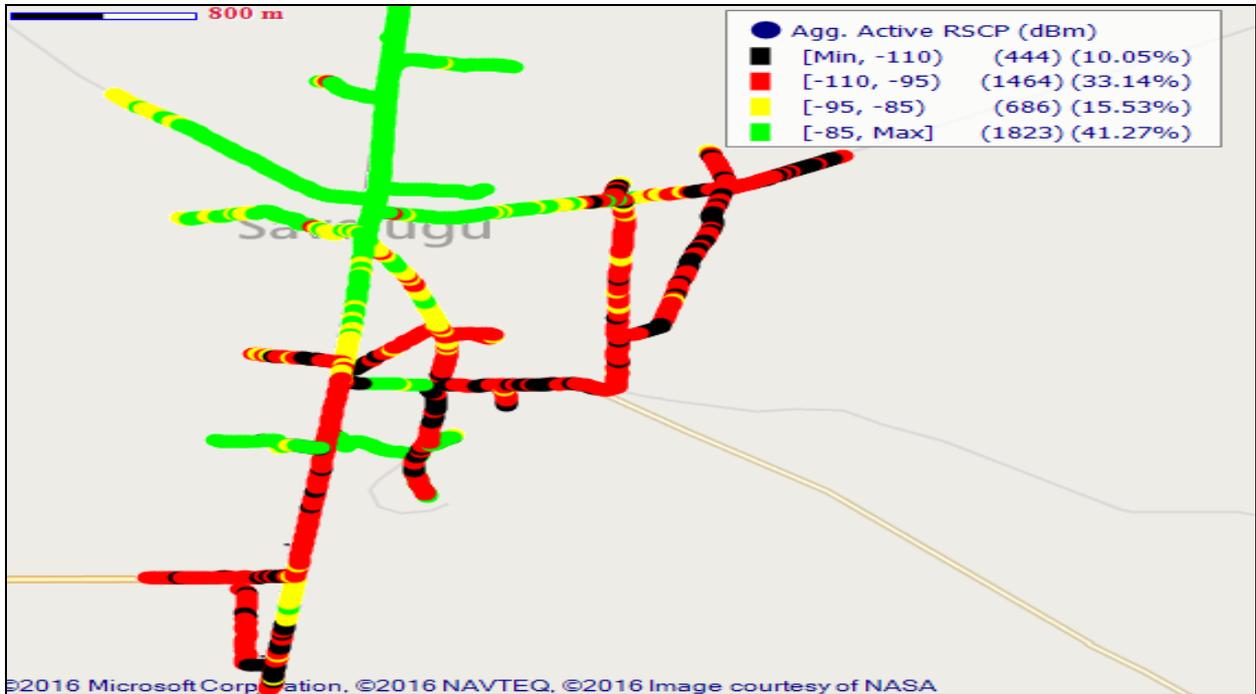


Remarks: 3G coverage at Sang is Non-existent. Vodafone needs to extend its 3G coverage to Sang.

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

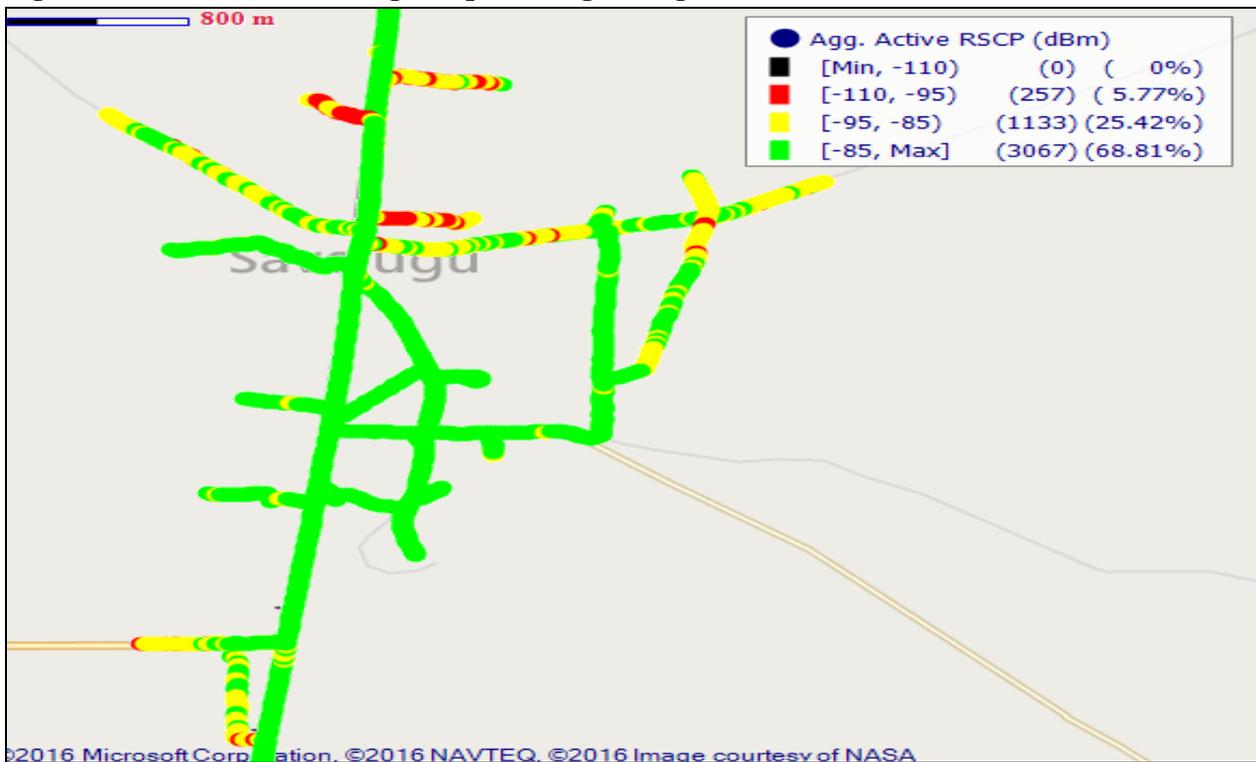
**COVERAGE AT SAVELUGU**

**Fig. 52 - MTN 3G Coverage Map, Savelugu - August 2016**



**Remarks:** Fair 3G coverage within Savelugu; however, improvement is needed at the District Assembly, Yipala, Kugafong and Yoo Naa’s Palace.

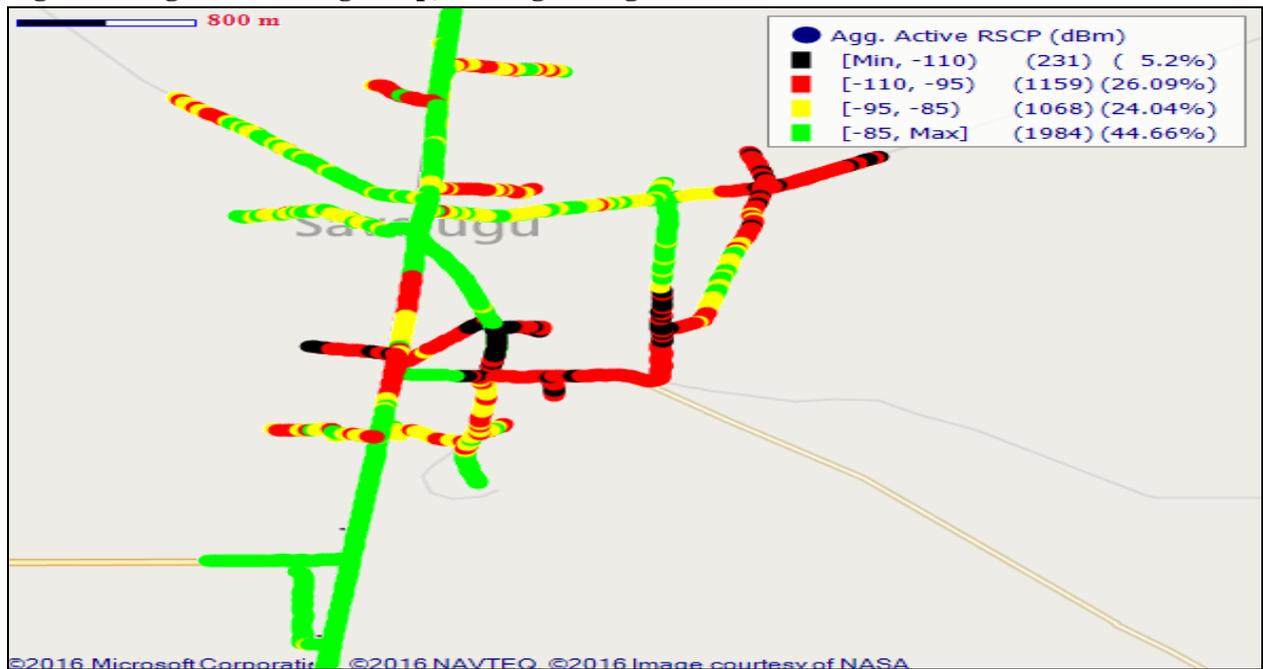
**Fig. 53 - Vodafone 3G Coverage Map, Savelugu - August 2016**



**Remarks:** Good 3G coverage at Savelugu.

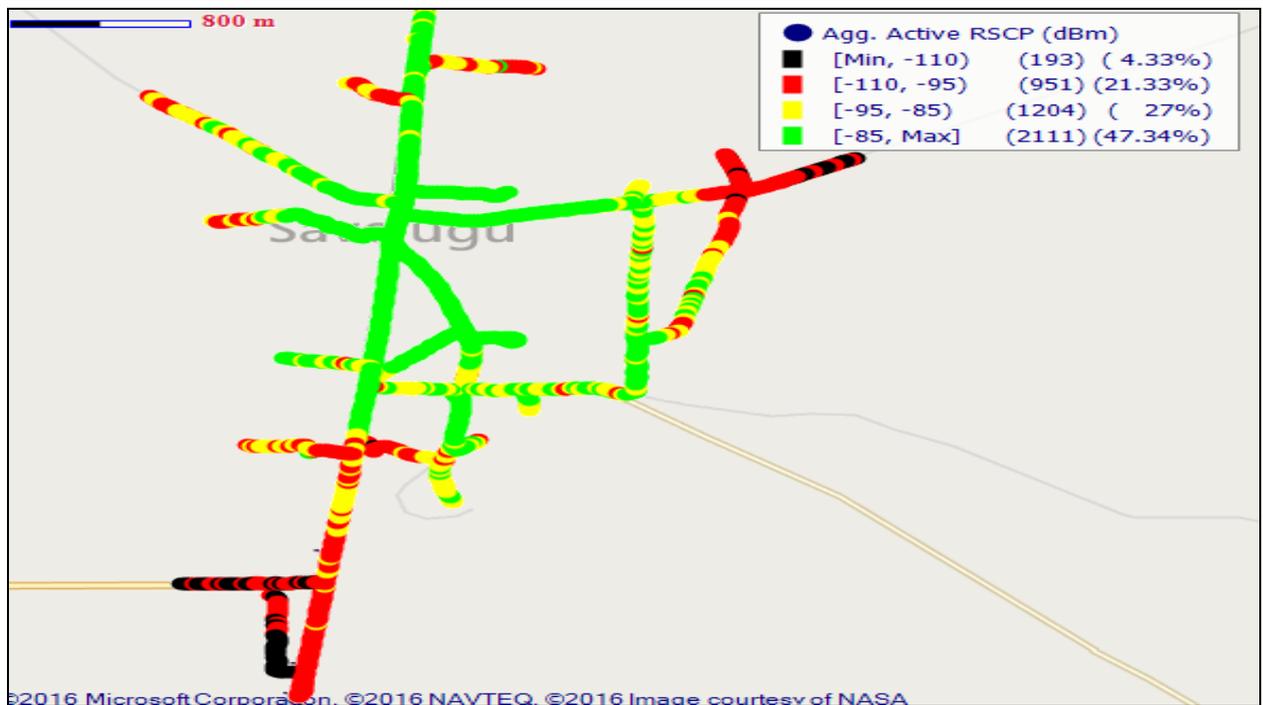
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 54 – Tigo 3G Coverage Map, Savelugu - August 2016**



**Remarks:** Fair 3G coverage in Savelugu; however improvement is needed at Yipala, Kwafon, Savelugu Senior High and Yoo Naa’s Palace.

**Fig. 55 – Airtel 3G Coverage Map, Savelugu - August 2016**

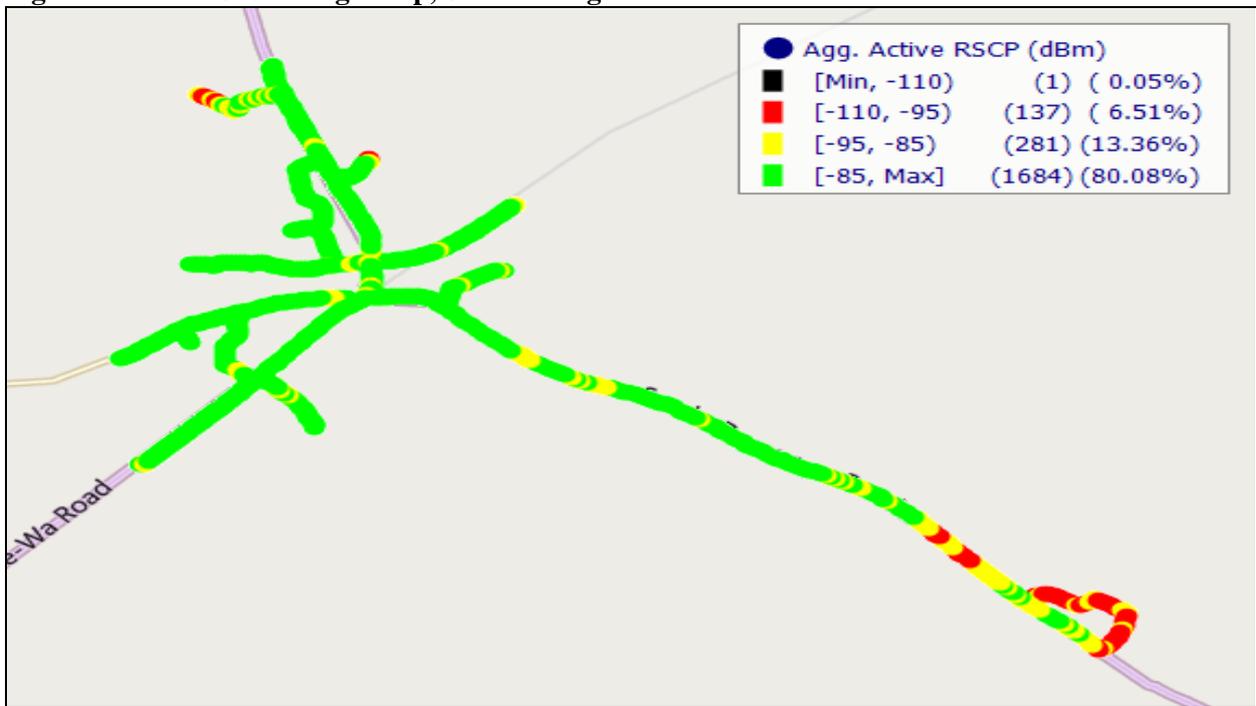


**Remarks:** Fair 3G coverage in Savelugu with improvement needed at Kwafon, District Assembly, Sawaba and Savelugu Senior High.

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

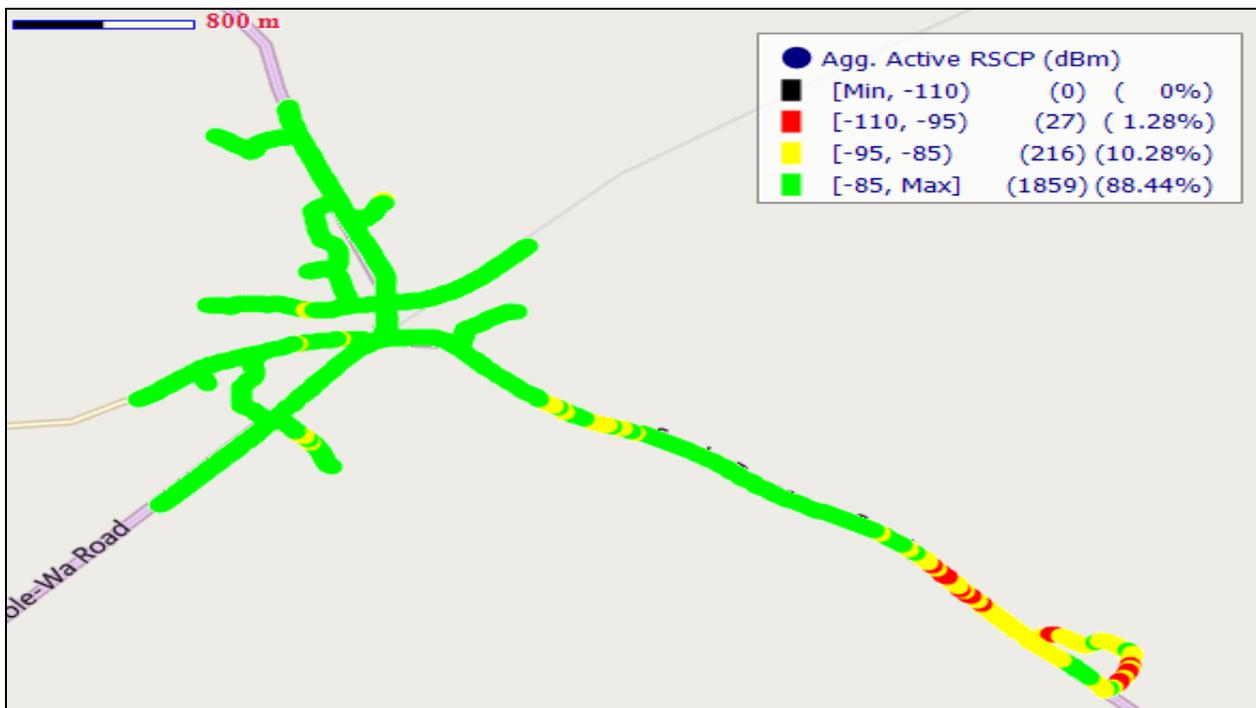
**COVERAGE AT SAWLA**

**Fig. 56 - MTN 3G Coverage Map, Sawla – August 2016**



**Remarks: Good 3G coverage in Sawla with improvement needed at the District Assembly and DCE’s Residence.**

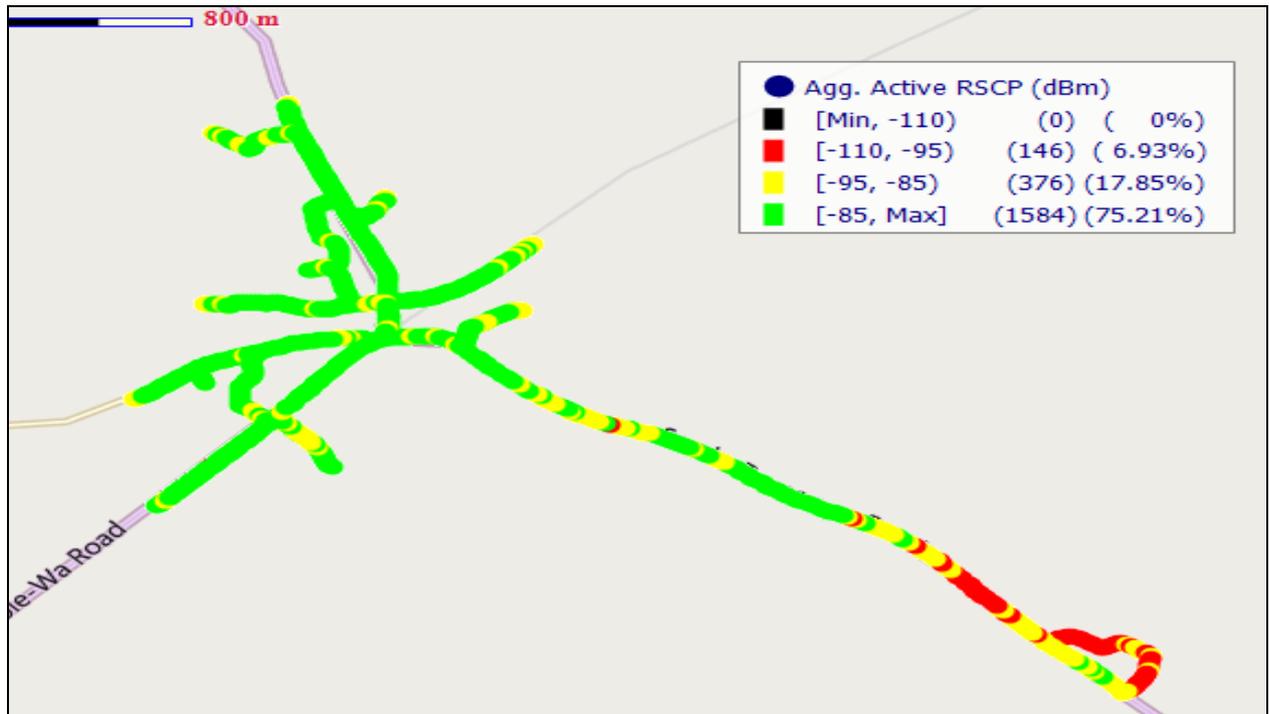
**Fig. 57 - Vodafone 3G Coverage Map, Sawla – August 2016**



**Remarks: Good 3G coverage at Sawla.**

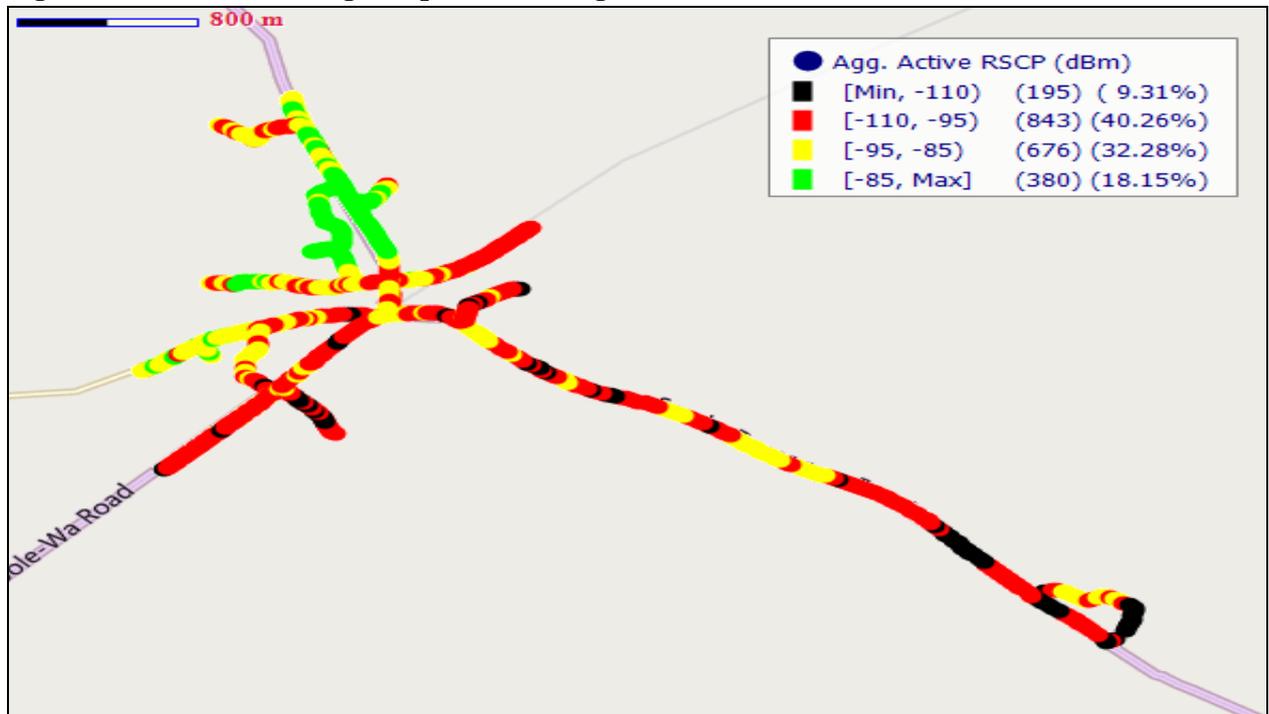
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 58 - Tigo 3G Coverage Map, Sawla – August 2016**



**Remarks: Good 3G coverage in Sawla with improvement needed at the District Assembly.**

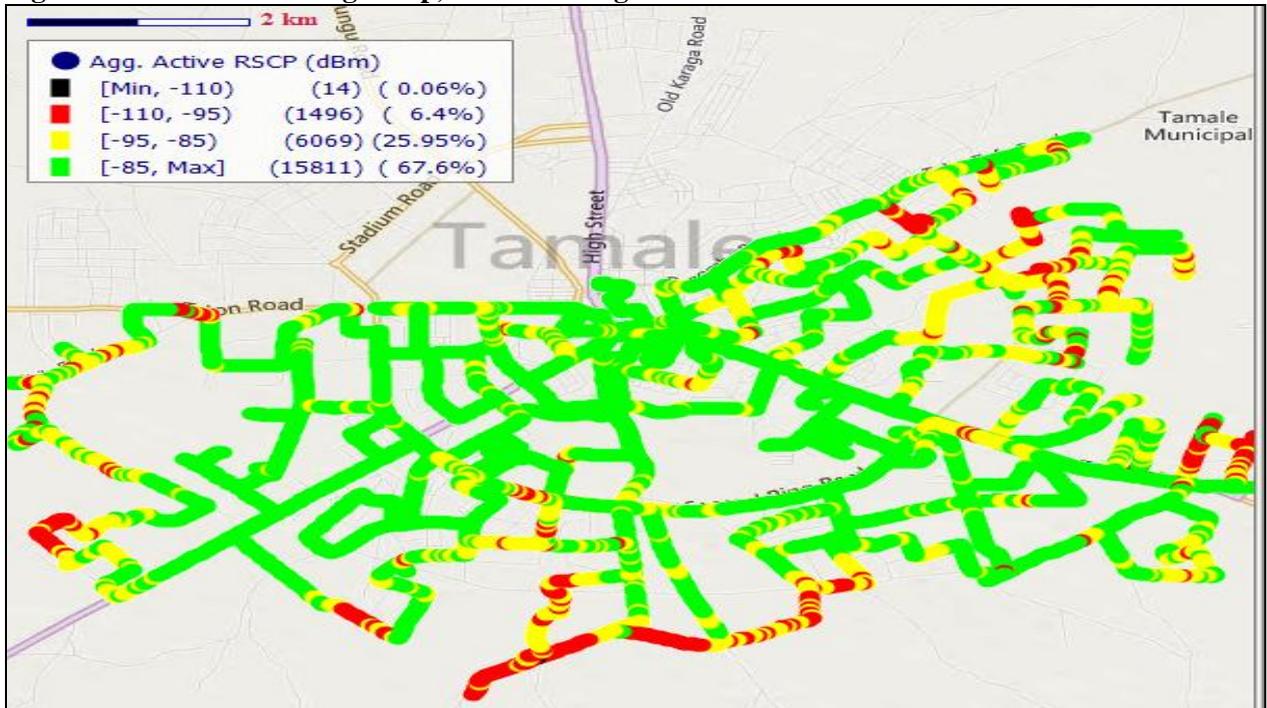
**Fig. 59 - Airtel 3G Coverage Map, Sawla – August 2016**



**Remarks: Fair 3G coverage at Sawla with several poor spots. Major improvement needed across the entire township.**

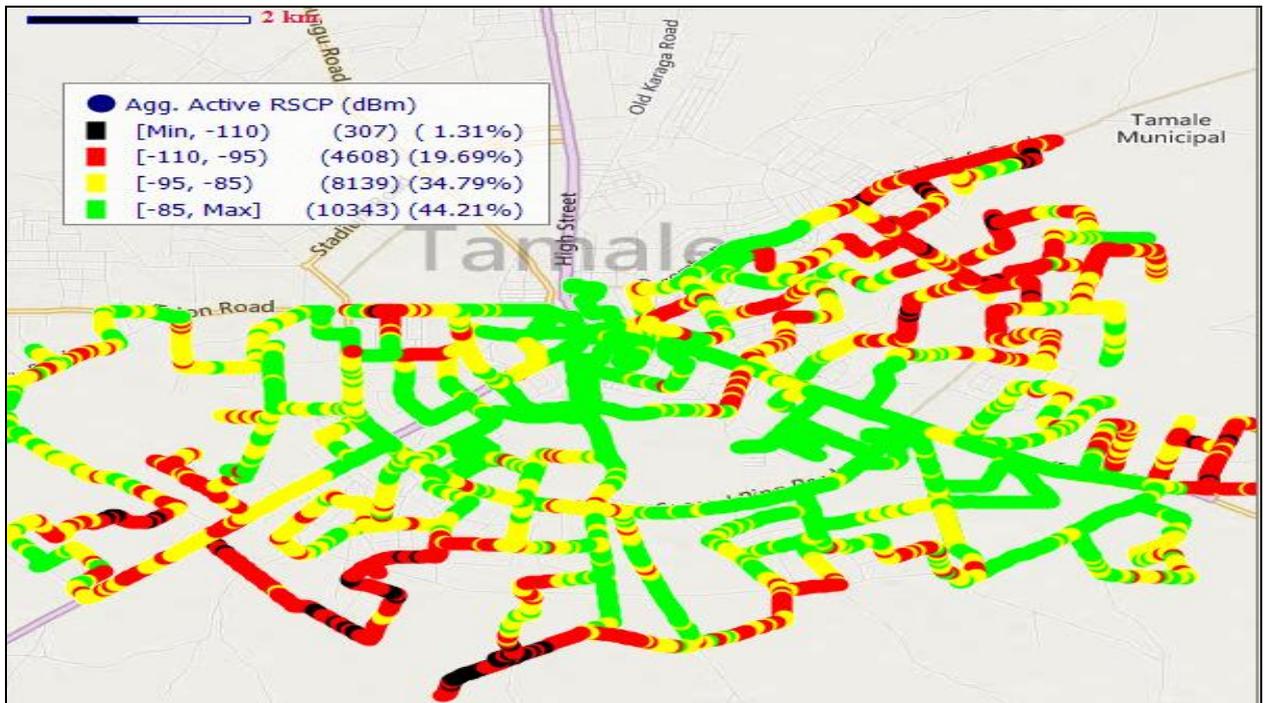
**COVERAGE AT TAMALE**

**Fig. 60 - MTN 3G Coverage Map, Tamale – August 2016**



Remarks: Good 3G Coverage in Tamale with spots of poor coverage across Tamale Metropolis which need improvement..

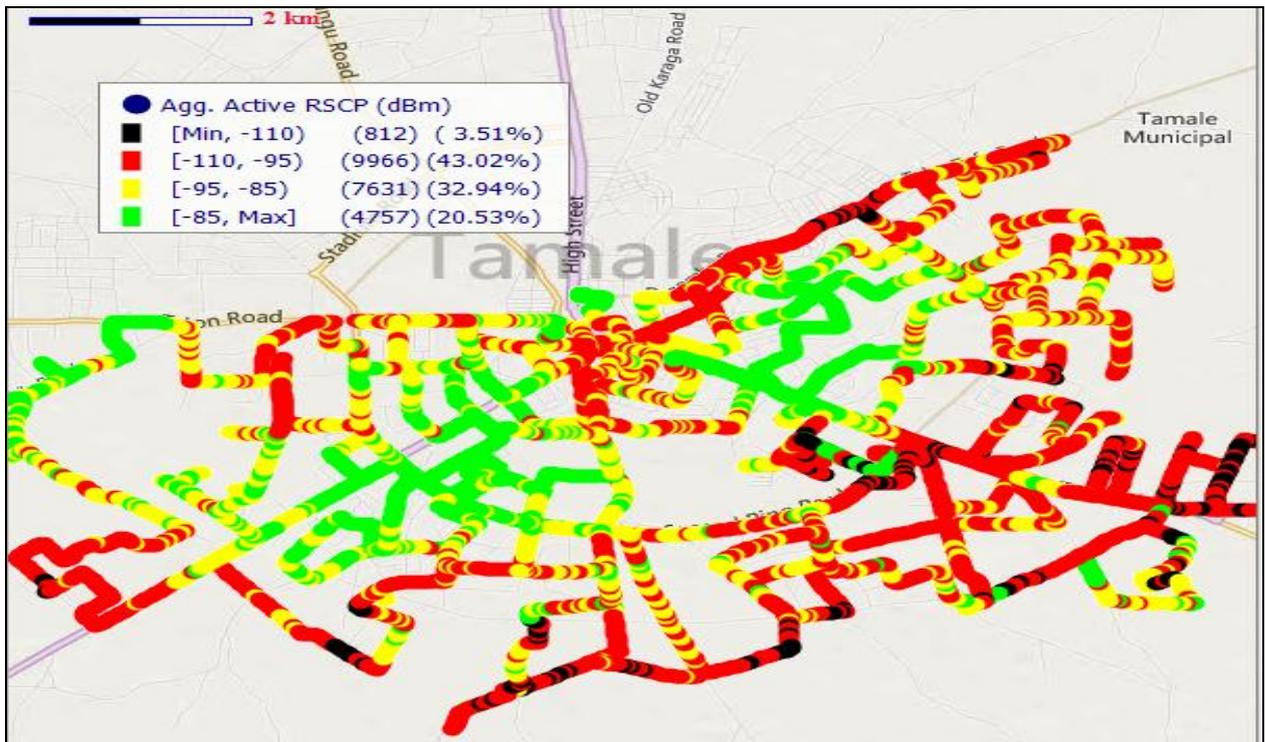
**Fig. 61 - Vodafone 3G Coverage Map, Tamale – August 2016**



Remarks: Fair 3G coverage at Tamale with spots of poor coverage across the entire Tamale Metropolis which requires improvement.

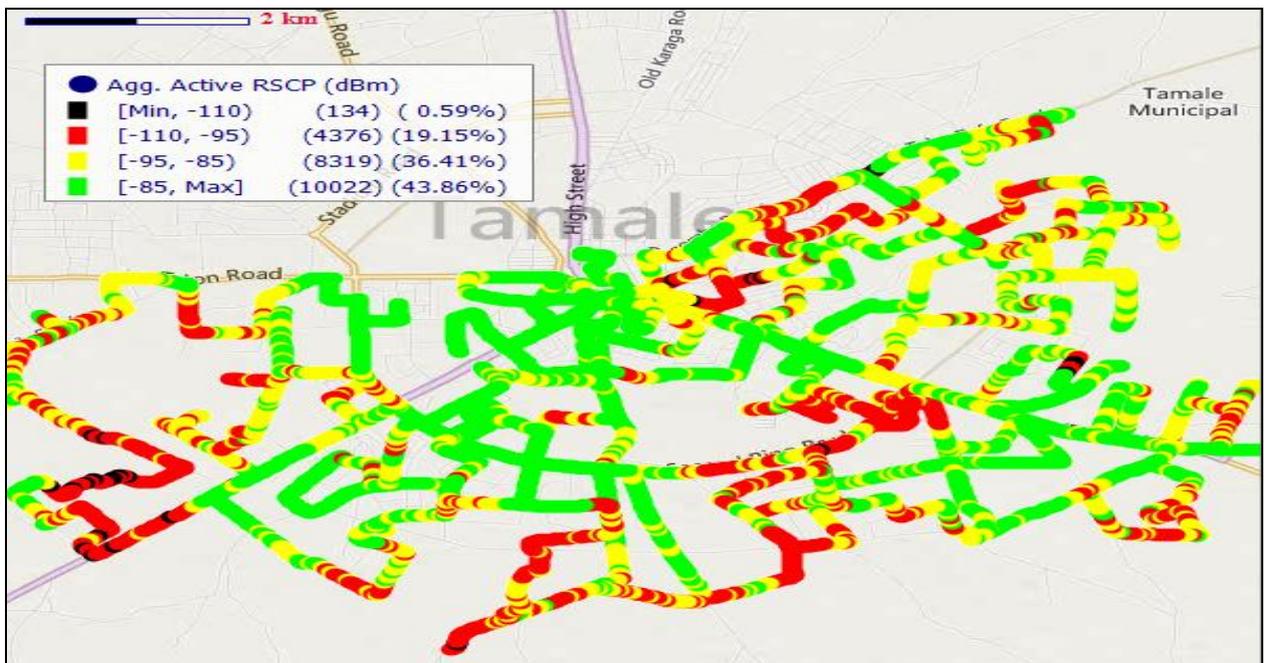
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 62 - Tigo 3G Coverage Map, Tamale – August 2016**



**Remarks:** Fair 3G coverage at Tamale; however improvement is required across the entire Tamale Metropolis.

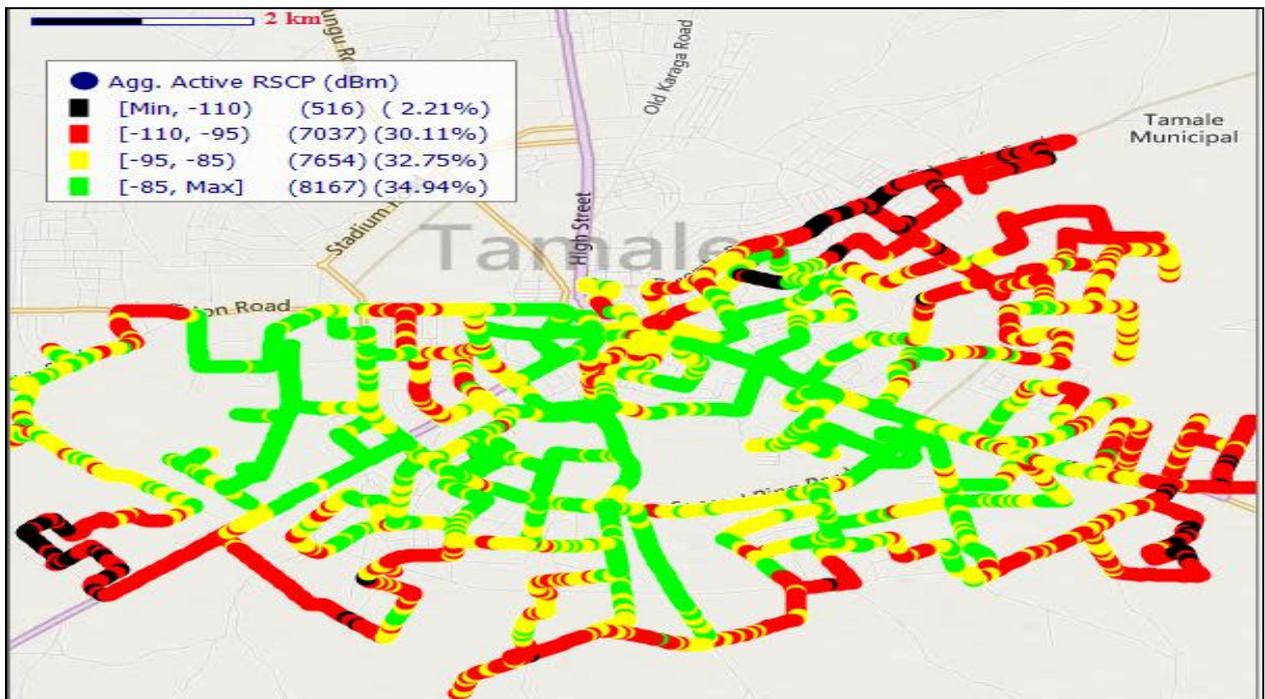
**Fig. 63 – Airtel 3G Coverage Map, Tamale – August 2016**



**Remarks:** Fair 3G coverage in Tamale. However, improvement is required across the entire Tamale Metropolis.

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

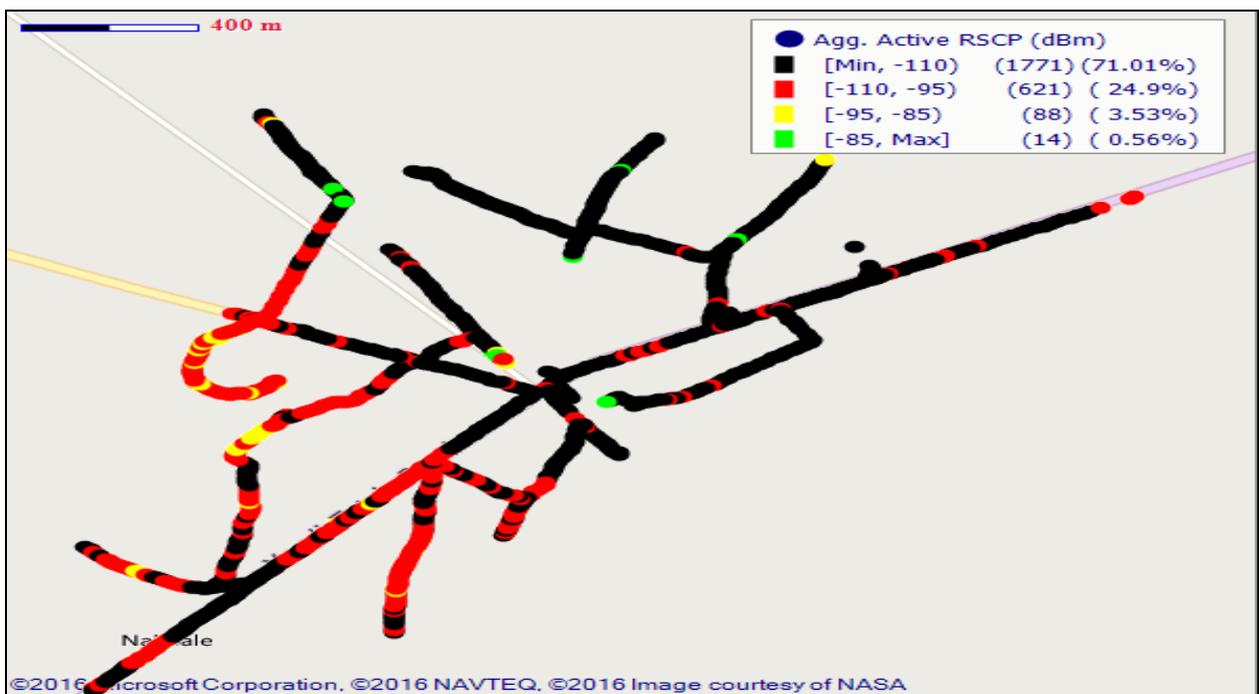
**Fig. 64– Glo 3G Coverage Map, Tamale – August 2016**



Remarks: Fair 3G coverage in Tamale, but improvement is required across the entire Tamale Metropolis.

**COVERAGE AT TATALE**

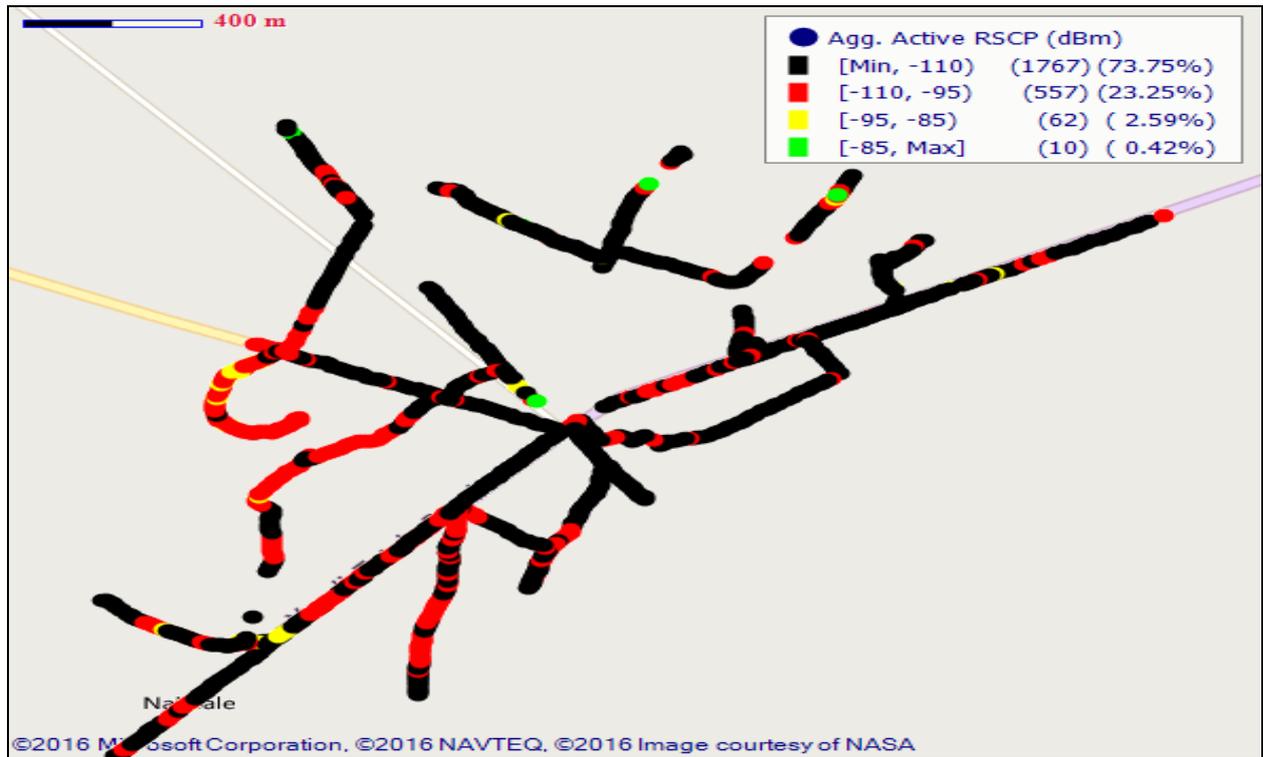
**Fig. 65 - MTN 3G Coverage Map, Tatala - September 2016**



Remarks: Non – existent 3G coverage in Tatala. 3G coverage must be extended to Tatala.

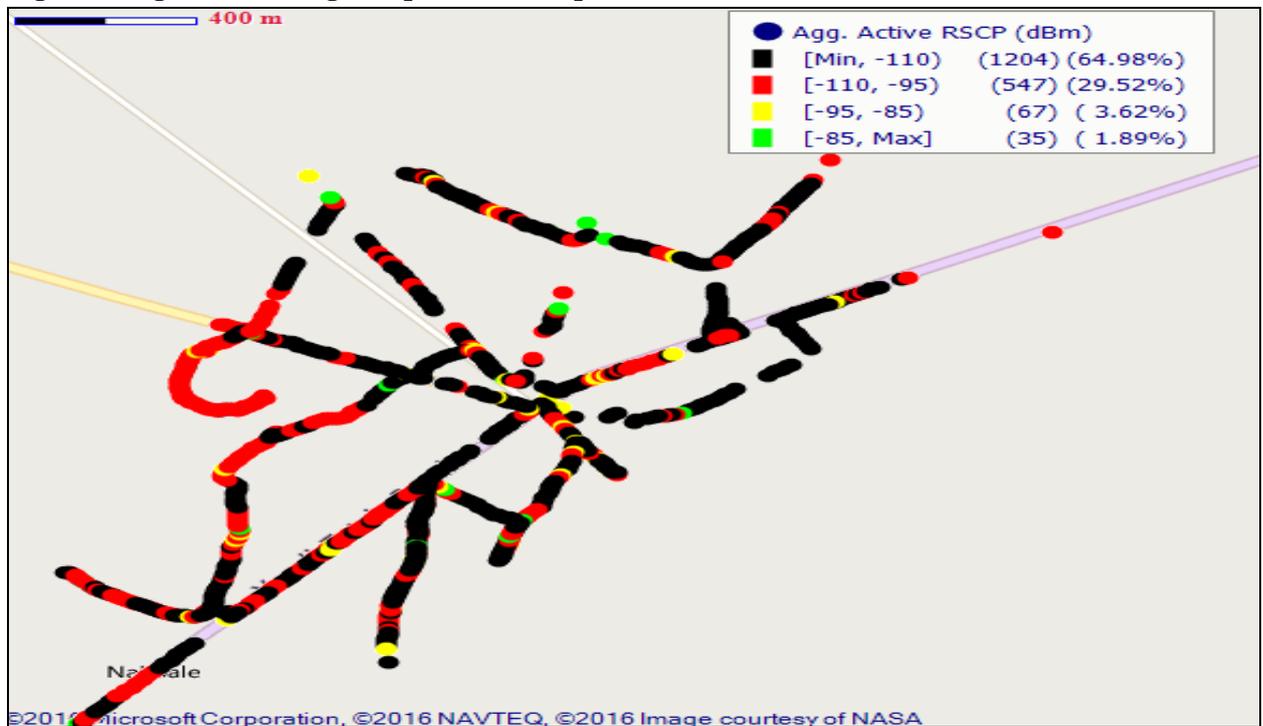
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 66- Vodafone 3G Coverage Map, Tatale – September 2016**



Remarks: Non- existent 3G coverage at Tatale. Vodafone needs to extend its 3G coverage to Tatale.

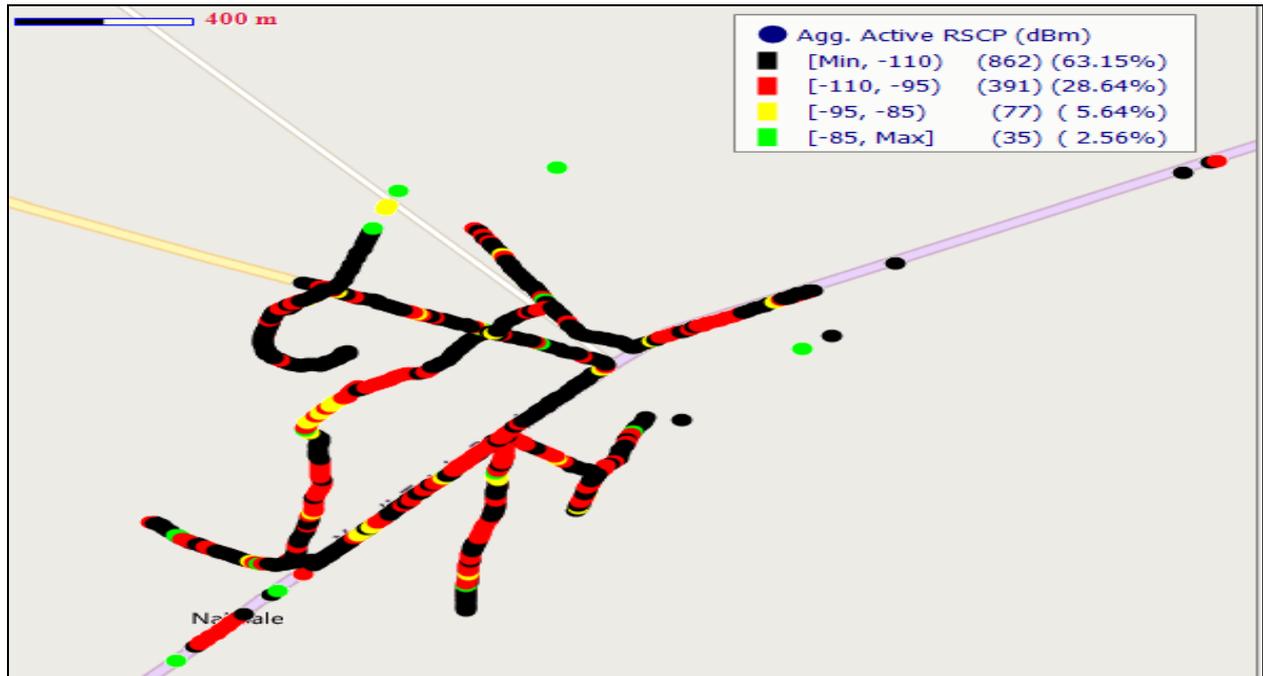
**Fig. 67 - Tigo 3G Coverage Map, Tatale – September 2016**



Remarks: 3G coverage in Tatale is Non-existent. Tigo needs to extend its 3G coverage to Tatale.

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

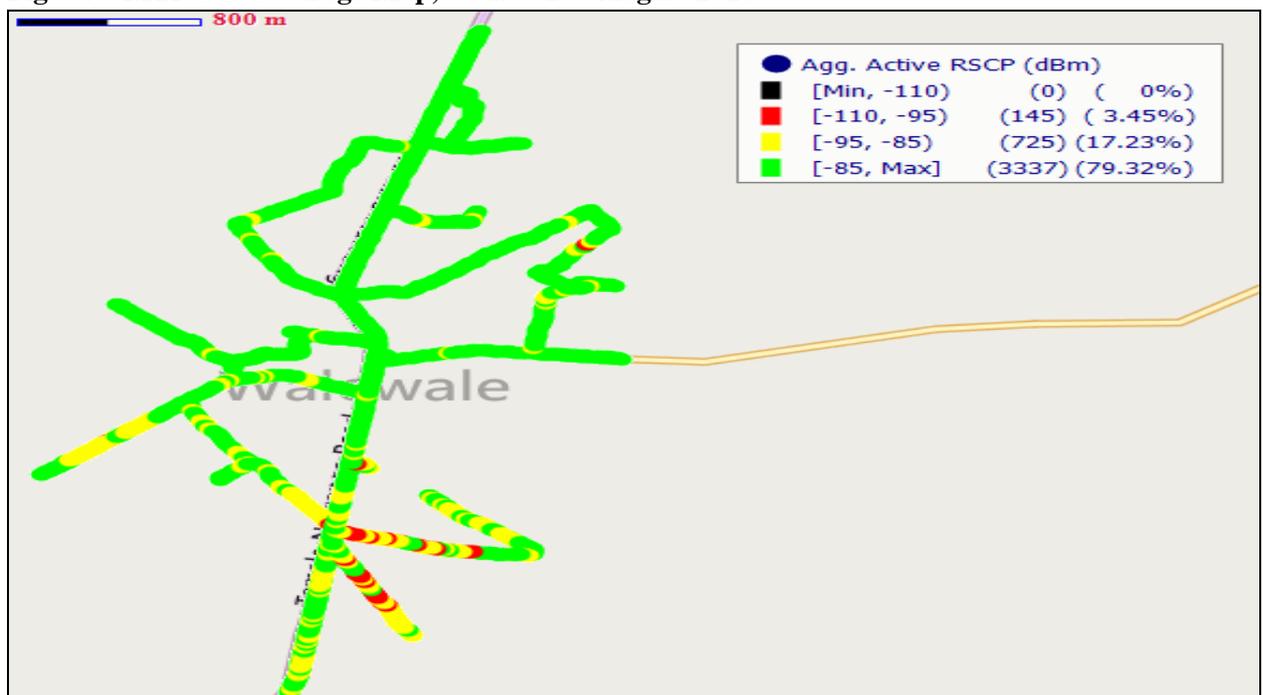
**Fig. 68 - Airtel 3G Coverage Map, Tatale – September 2016**



Remarks: 3G coverage in Tatale is Non-existent. Airtel needs to extend its 3G coverage to Tatale.

**COVERAGE AT WALEWALE**

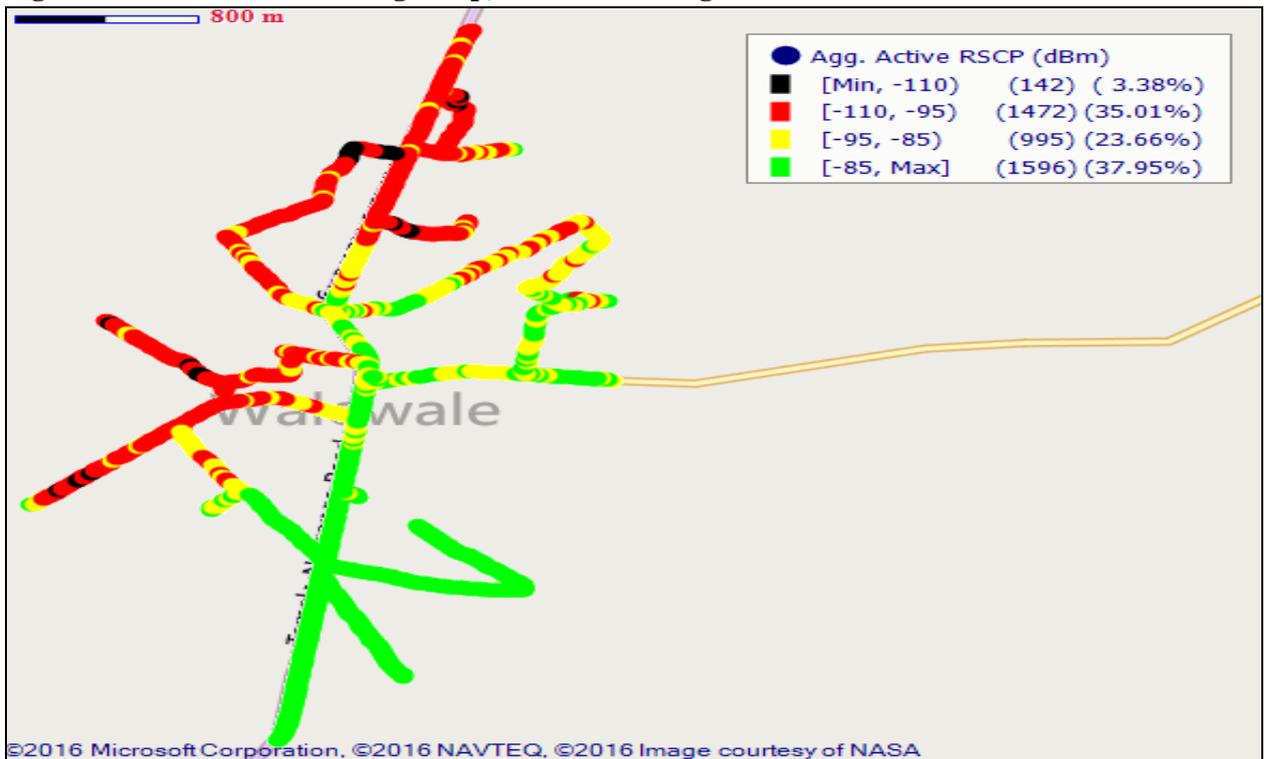
**Fig. 69 - MTN 3G Coverage Map, Walewale – August 2016**



Remarks: Good 3G coverage at Walewale.

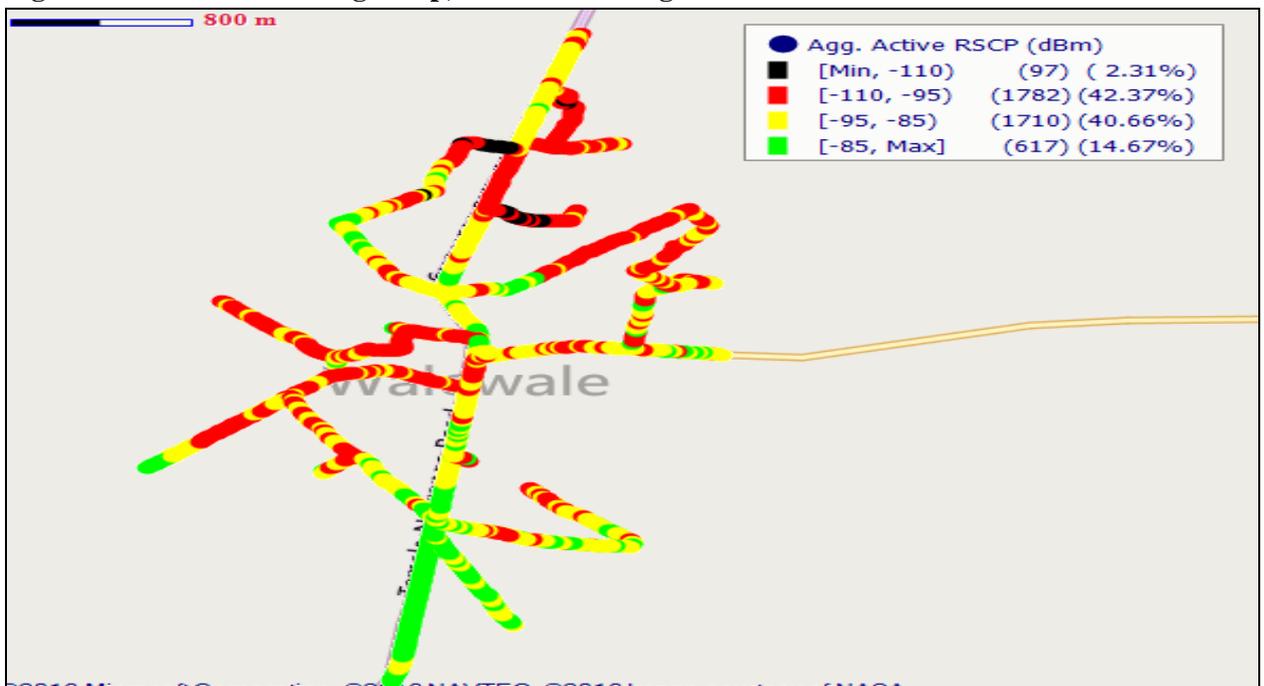
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 70 – Vodafone 3G Coverage Map, Walewale – August 2016**



Remarks: Fair 3G coverage; however, improvement is needed at Market, Hospital and Kukuazugu No2.

**Fig. 71 – Airtel 3G Coverage Map, Walewale – August 2016**

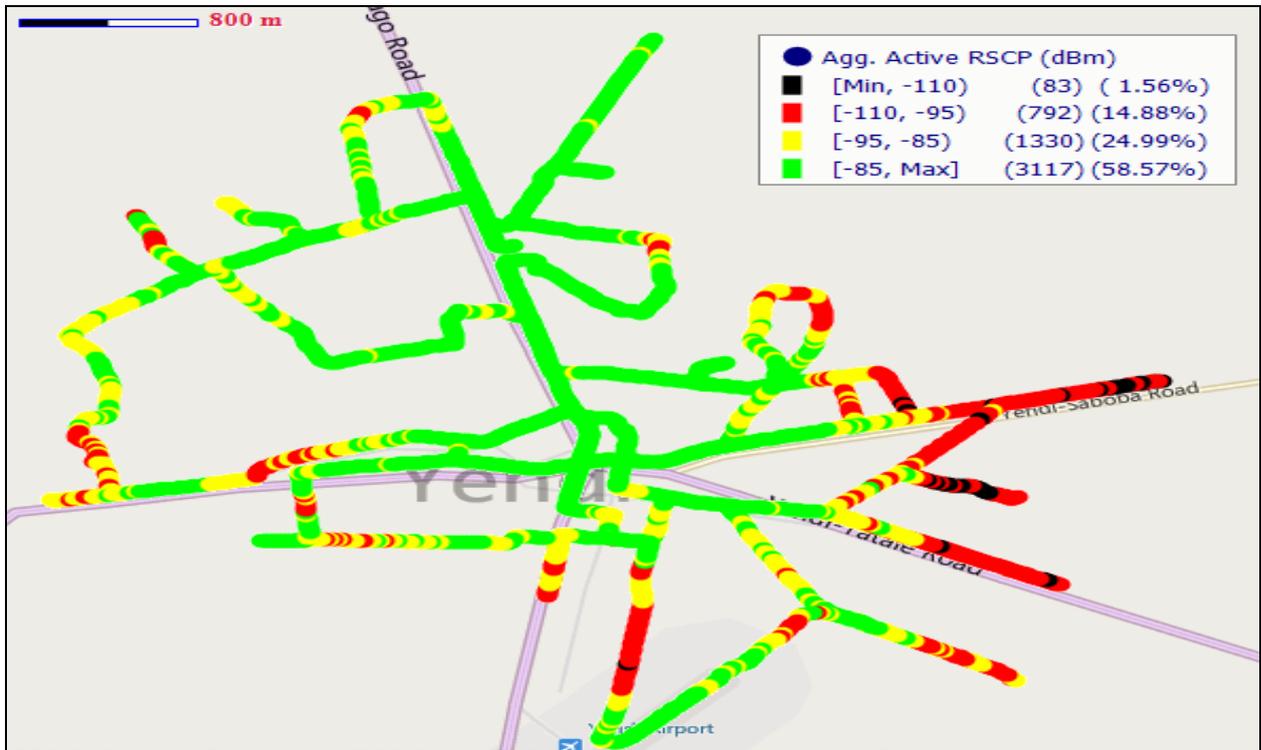


Remarks: Fair 3G Coverage at Walewale. However, improvement is required across the entire township.

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

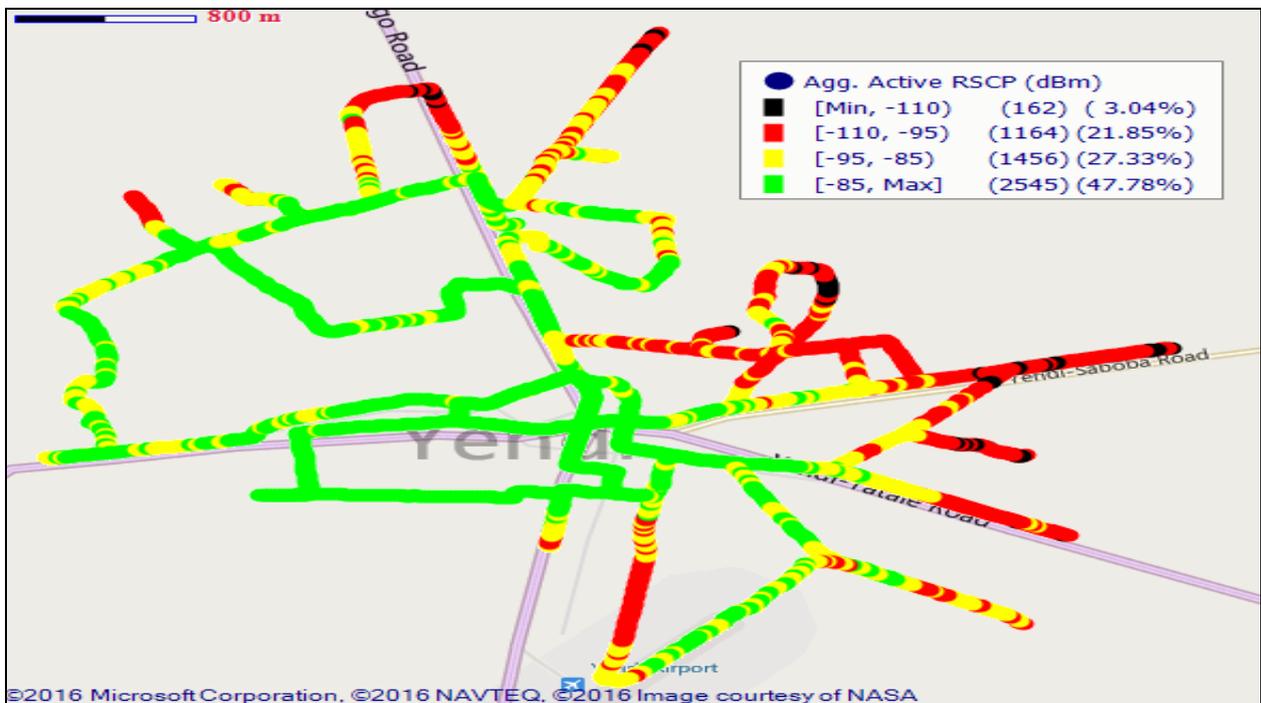
**COVERAGE AT YENDI**

**Fig. 72 – MTN 3G Coverage Map, Yendi – August 2016**



**Remarks: Good 3G coverage at Yendi with spots of poor coverage which need improvement.**

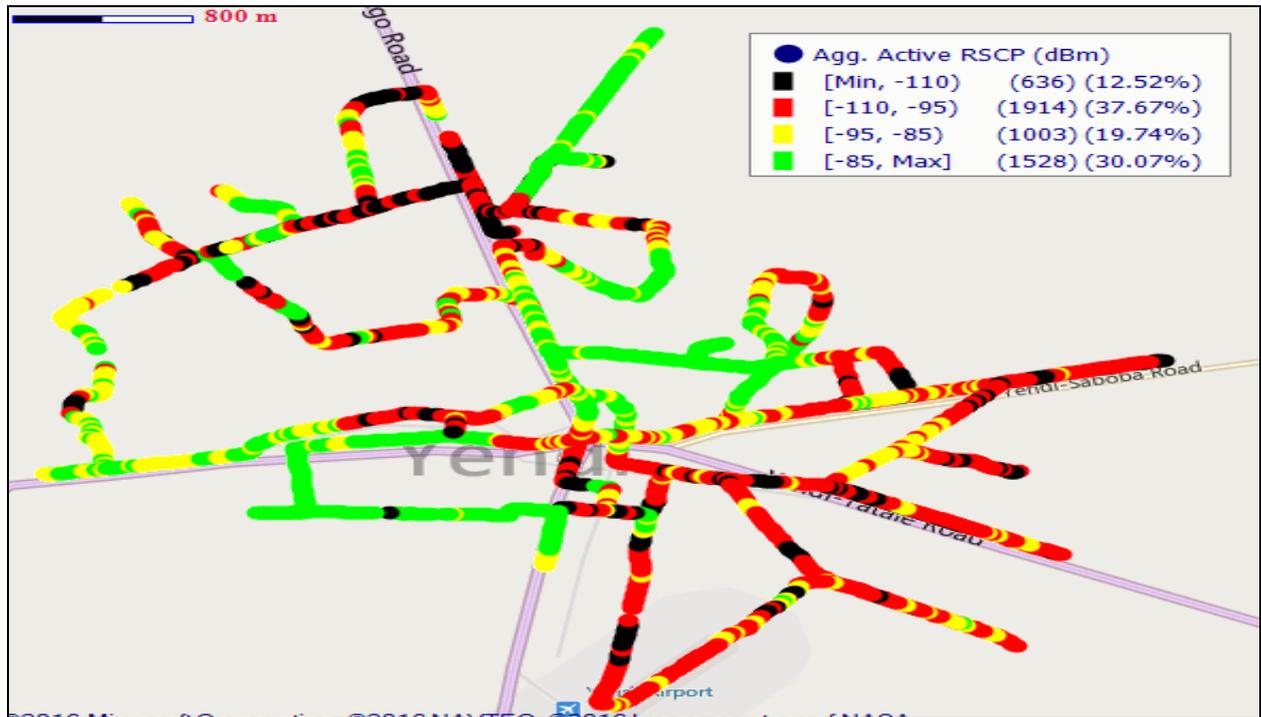
**Fig. 73- Vodafone 3G Coverage Map, Yendi – August 2016**



**Remarks: Fair 3G Coverage with improvement needed at Mendogo, Sikafuo, Guntangli, Catholic Guest House and Dagbon State Senior High School.**

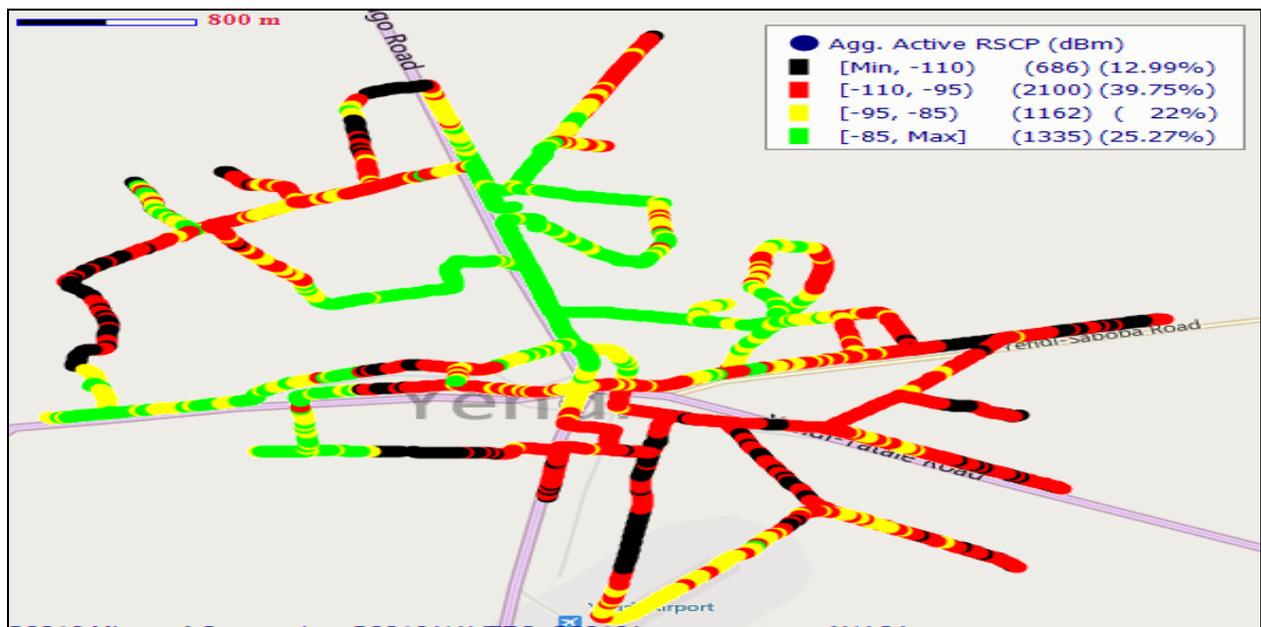
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 74 – Tigo 3G Coverage Map, Yendi – August 2016**



**Remarks: Poor 3G Coverage at Yendi with major improvement required across the entire Yendi Township.**

**Fig. 75 – Airtel 3G Coverage Map, Yendi – August 2016**

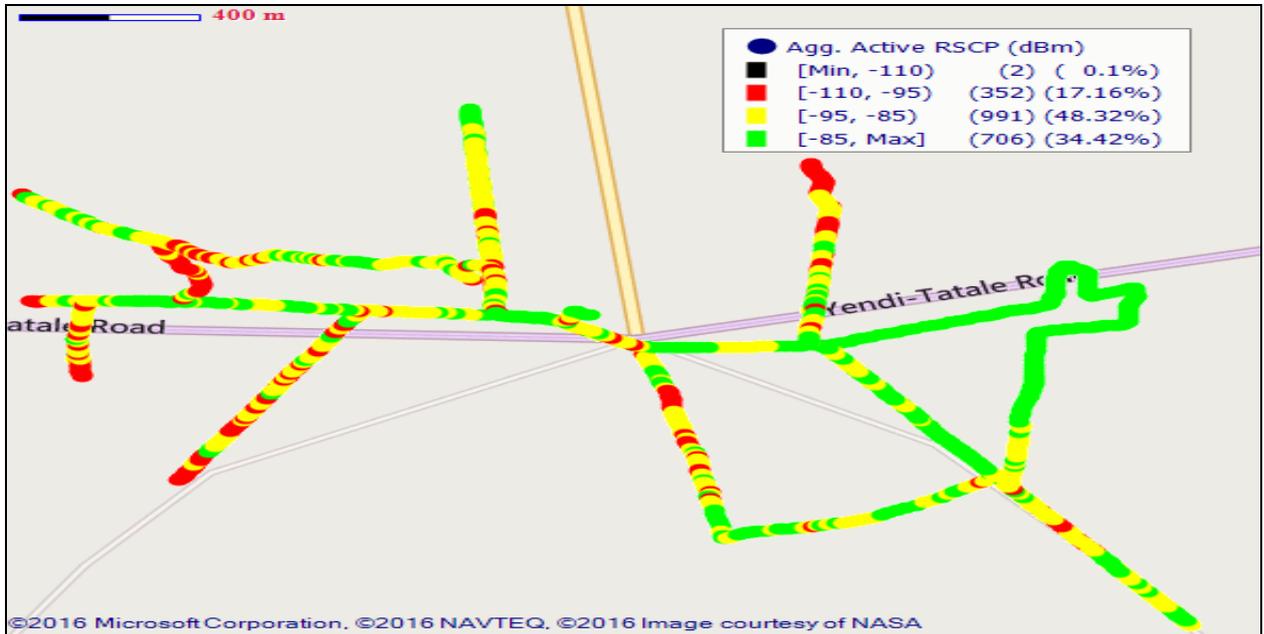


**Remarks: Poor 3G coverage in Yendi. Major improvement needed at Nayilfong, Guntangli, Mendongo and Catholic Guest House.**

3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016

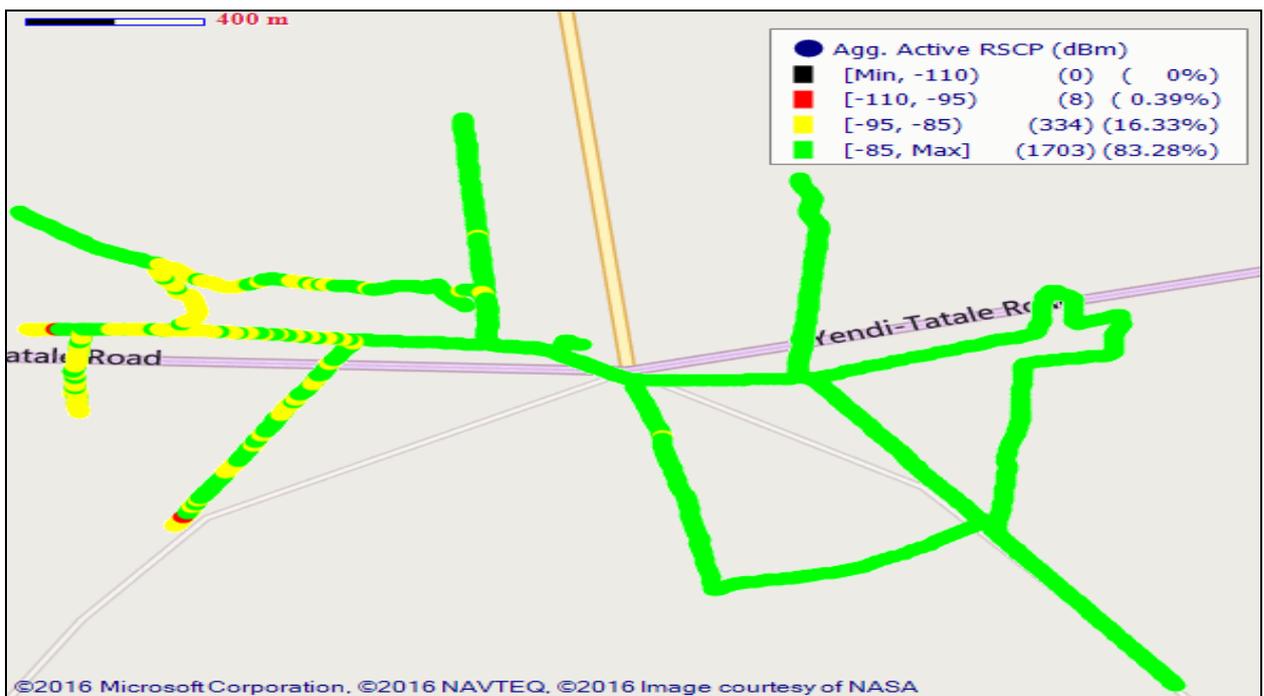
**COVERAGE AT ZABZUGU**

Fig. 76- MTN 3G Coverage Map, Zabzugu – September 2016



Remarks: Fair 3G coverage within Zabzugu; however improvement is required across the entire Zabzugu.

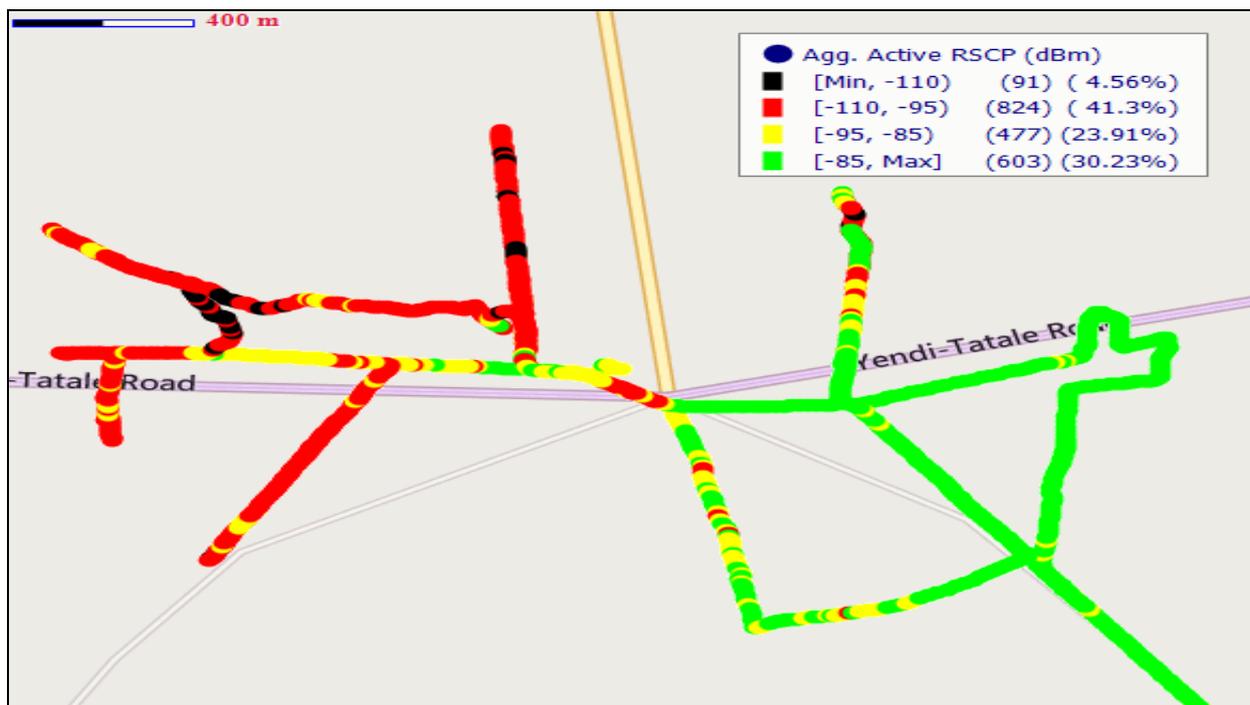
Fig. 77 – Vodafone 3G Coverage Map, Zabzugu – September 2016



Remarks: Good 3G coverage at Zabzugu.

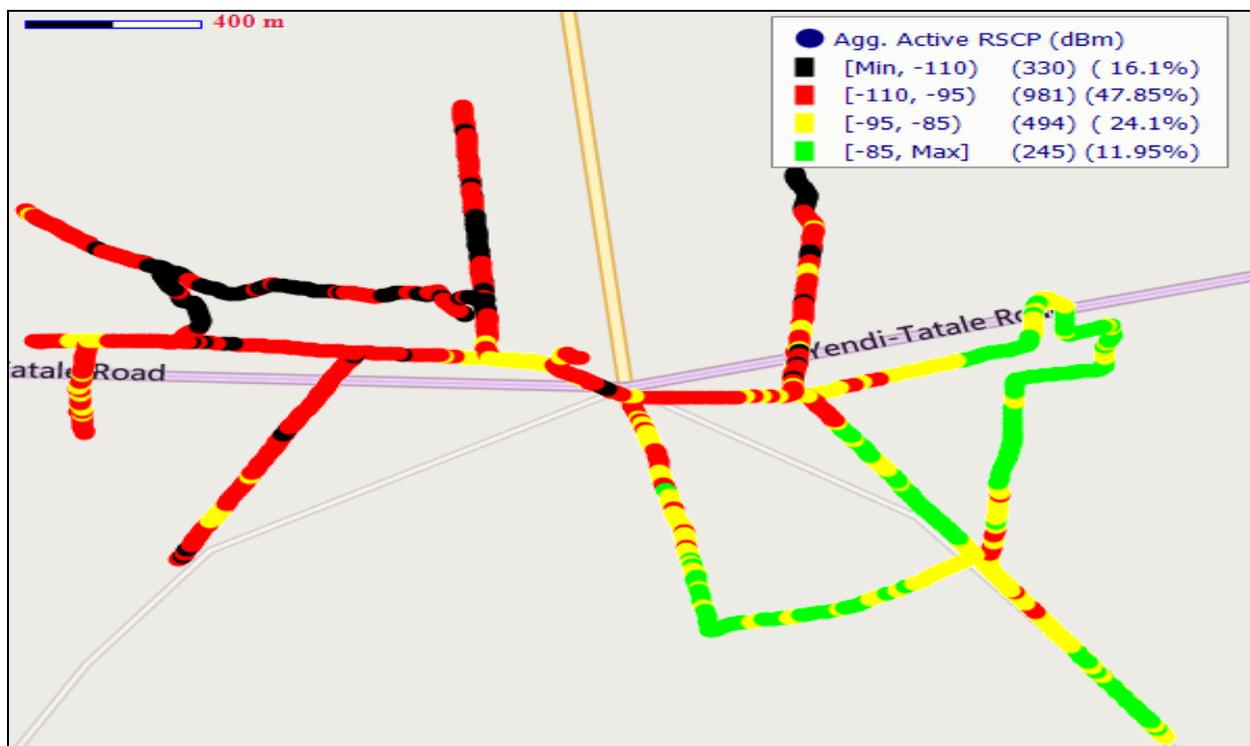
**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 78 – Tigo 3G Coverage Map, Zabzugu – September 2016**



**Remarks:** Fair 3G coverage with improvement needed at Nangeli, Solayayili, Market and Lorry Station.

**Fig. 79 - Airtel 3G Coverage Map, Zabzugu – September 2016**

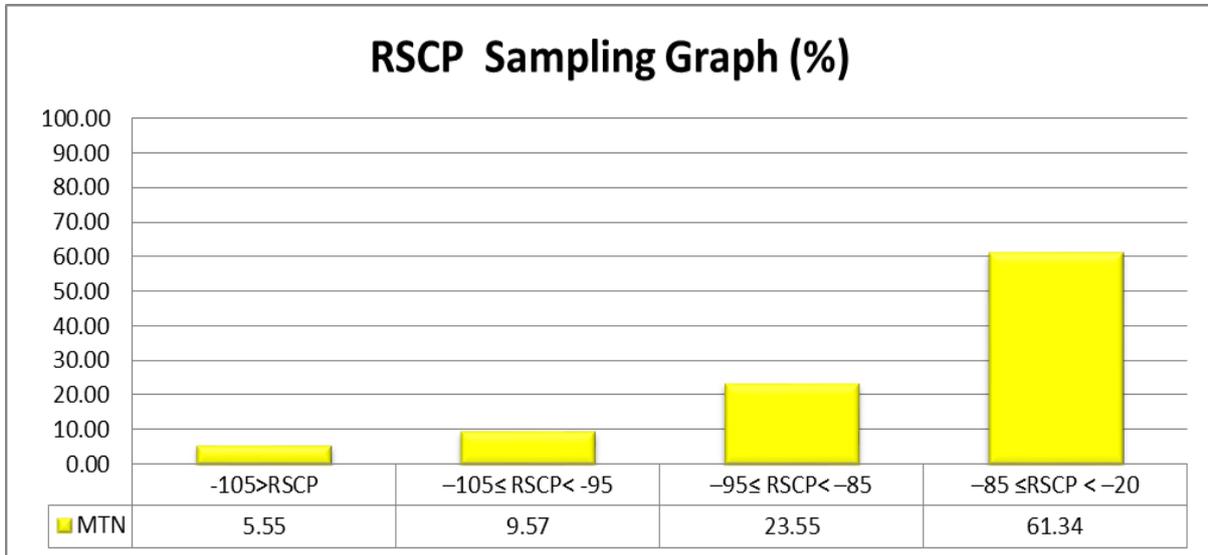


**Remarks:** Poor 3G coverage in Zabzugu. Major improvement needed at Zabzugu SHS, Market, Solayayili and Nangeli.

**APPENDIX II**

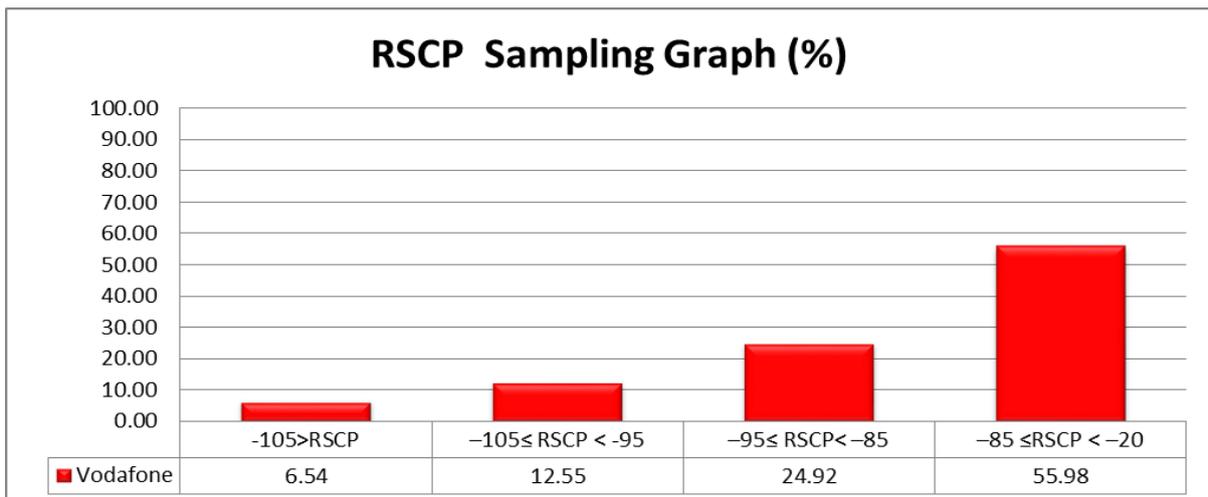
**RSCP SAMPLING DISTRIBUTION**

**Fig. 80 - MTN 3G Coverage Samples Plot in the Northern Region**



**Remarks: MTN recorded its highest count of RSCP samples in the range  $-85 \leq RSCP < -20$  dBm; representing “Good” 3G coverage across most of the District Capitals tested in the Northern Region.**

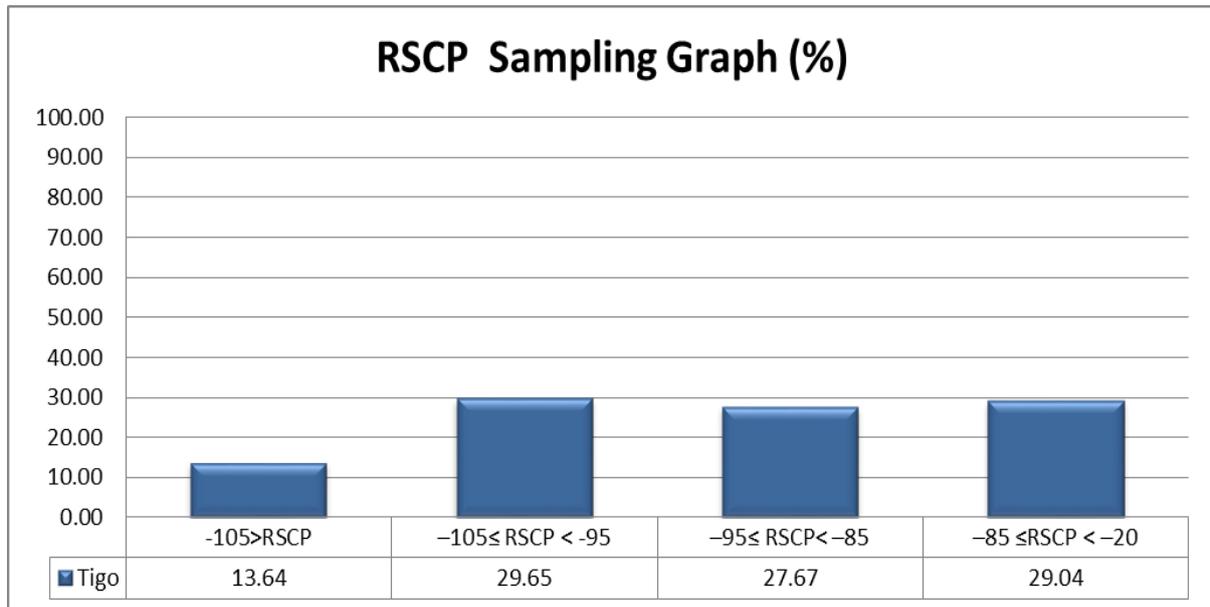
**Fig. 81 - Vodafone 3G Coverage Samples Plot in the Northern Region**



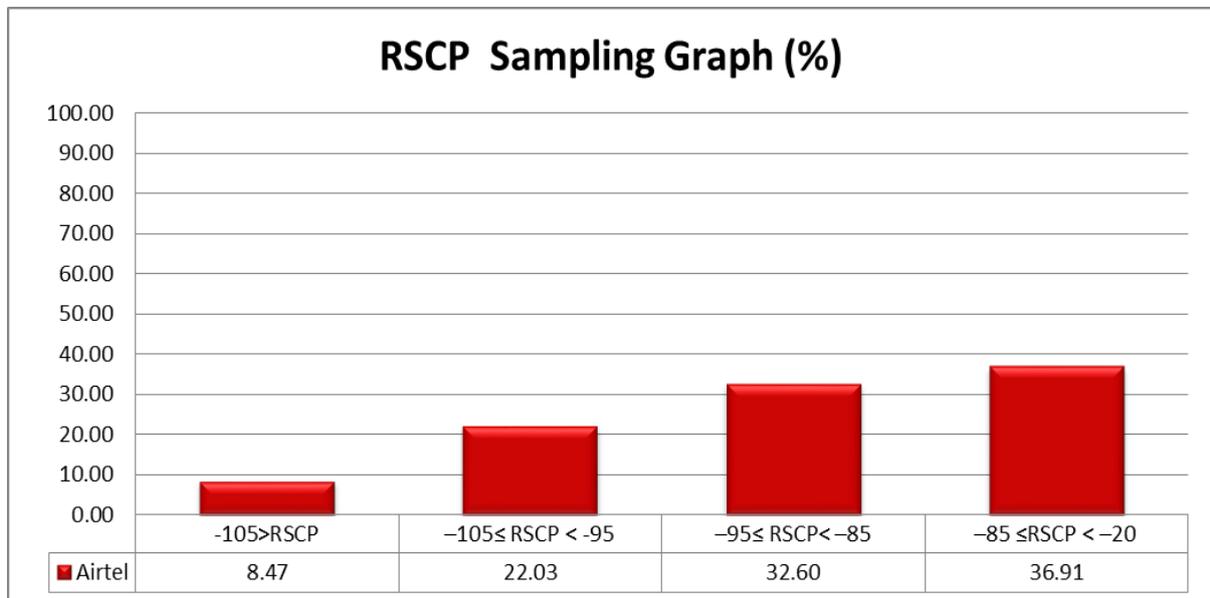
**Remarks: Vodafone recorded its highest count of RSCP samples in the range  $-85 \leq RSCP < -20$  dBm; representing “Good” 3G coverage across most of the District Capitals tested in the Northern Region.**

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 82 - Tigo 3G Coverage Samples Plot in the Northern Region**



**Remarks:** Tigo recorded its highest count of RSCP samples in the range  $-105 \leq \text{RSCP} < -95$  dBm; representing “Poor” 3G coverage across most of the District Capitals tested in the Northern Region.

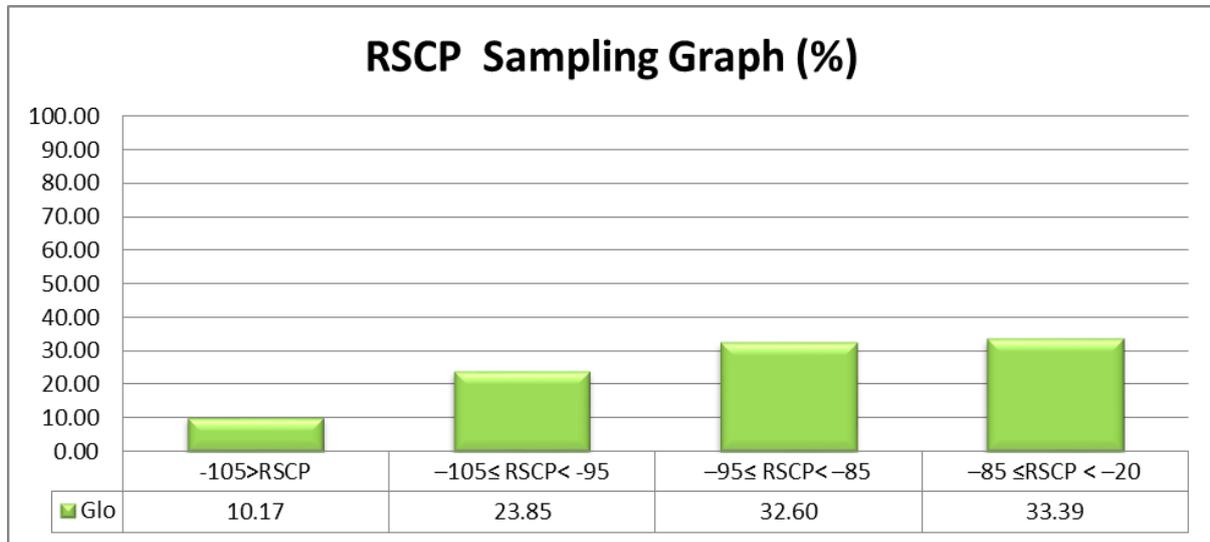


**Fig. 83 - Airtel 3G Coverage Samples Plot in the Northern Region**

**Remarks:** Airtel recorded its highest count of RSCP samples in the range  $-85 \leq \text{RSCP} < -20$  dBm; representing “Good” 3G coverage across most of the District Capitals tested in the Northern Region.

**3G COVERAGE ASSESSMENT OF CELLULAR MOBILE SERVICES IN NORTHERN REGION, AUGUST – SEPTEMBER 2016**

**Fig. 84 - Glo 3G Coverage Samples Plot in the Northern Region**



**Remarks: Glo recorded its highest count of RSCP samples in the range  $-85 \leq \text{RSCP} < -20$  dBm; representing “Good” 3G coverage across Sagnarigu and Tamale District Capitals in the Northern Region**