Crowdsourced Report by RantCell
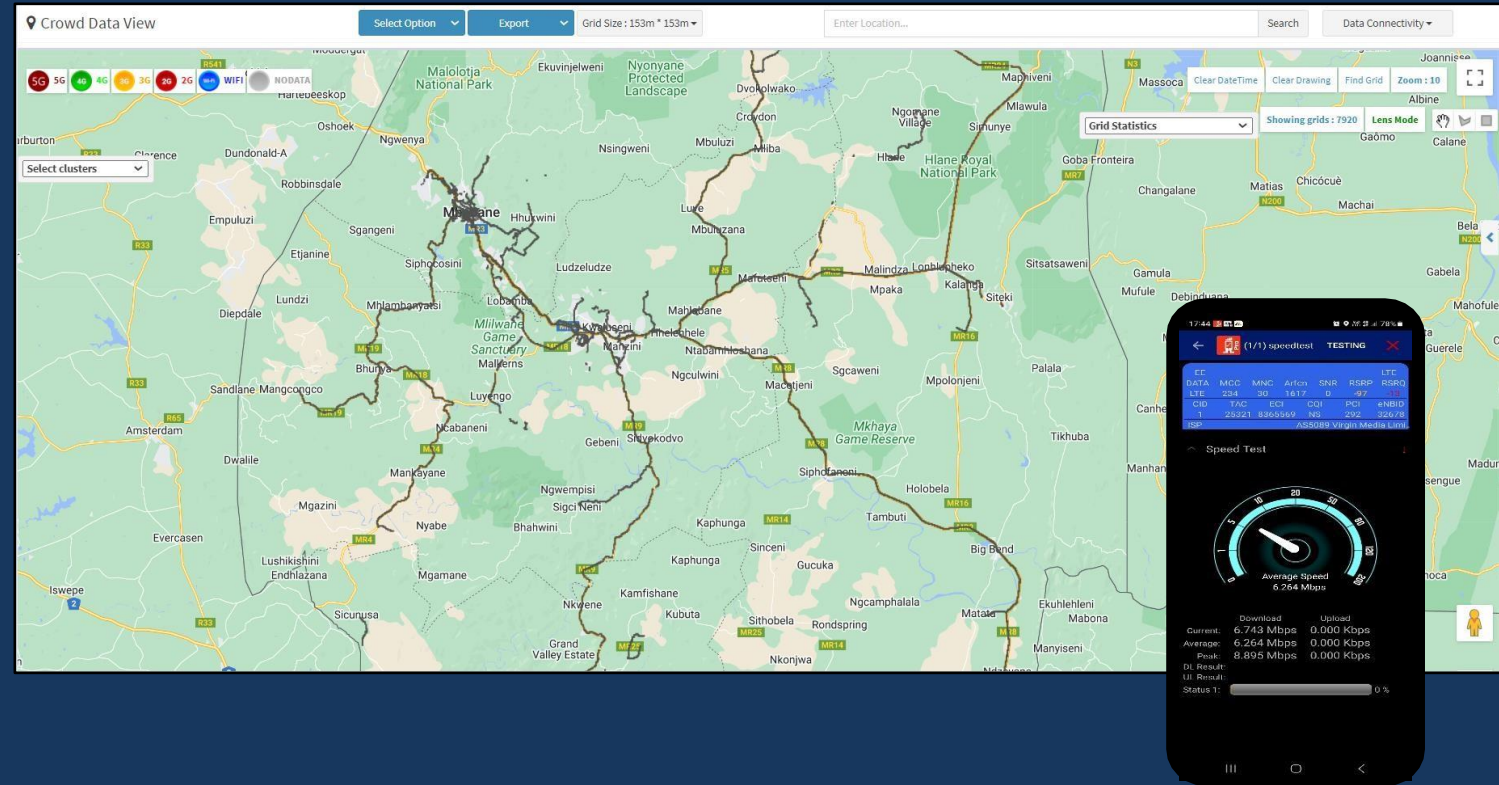
RantCell Crowd Metrix Solution of Megron Tech Ltd UK

www.rantcell.com

Benefits of using our RantCell Crowd Solution.

- By rolling out RantCell lite on more users in various cities can significantly identify network issues.

- Improving operation efficiency and customer satisfaction.

- Significant reduction in drive testing costs by using the platform.

- Higher footprint of network with a greater number of users.

- The RantCell lite app can also support drive testing by initiating active testing.

Introduction

This report aims to provide Crowd Data information captured by the RantCell solution and key insights into the user experience on Mobile.

Crowd data was collected from 6 Android handsets belonging to employees of Mobile by installing the RantCell lite app. All users carried on with their daily routines, network data was collected in the background process and from the Android phones.

During the trial, approximately

186 sq km of area was measured with

5 million samples.

Summary

- The crowd data measured previously was 24 sq km of area with 1.3 million samples.

- Now we have updated the report with the latest data with the coverage of area 185 sq km of area with 5 million samples.
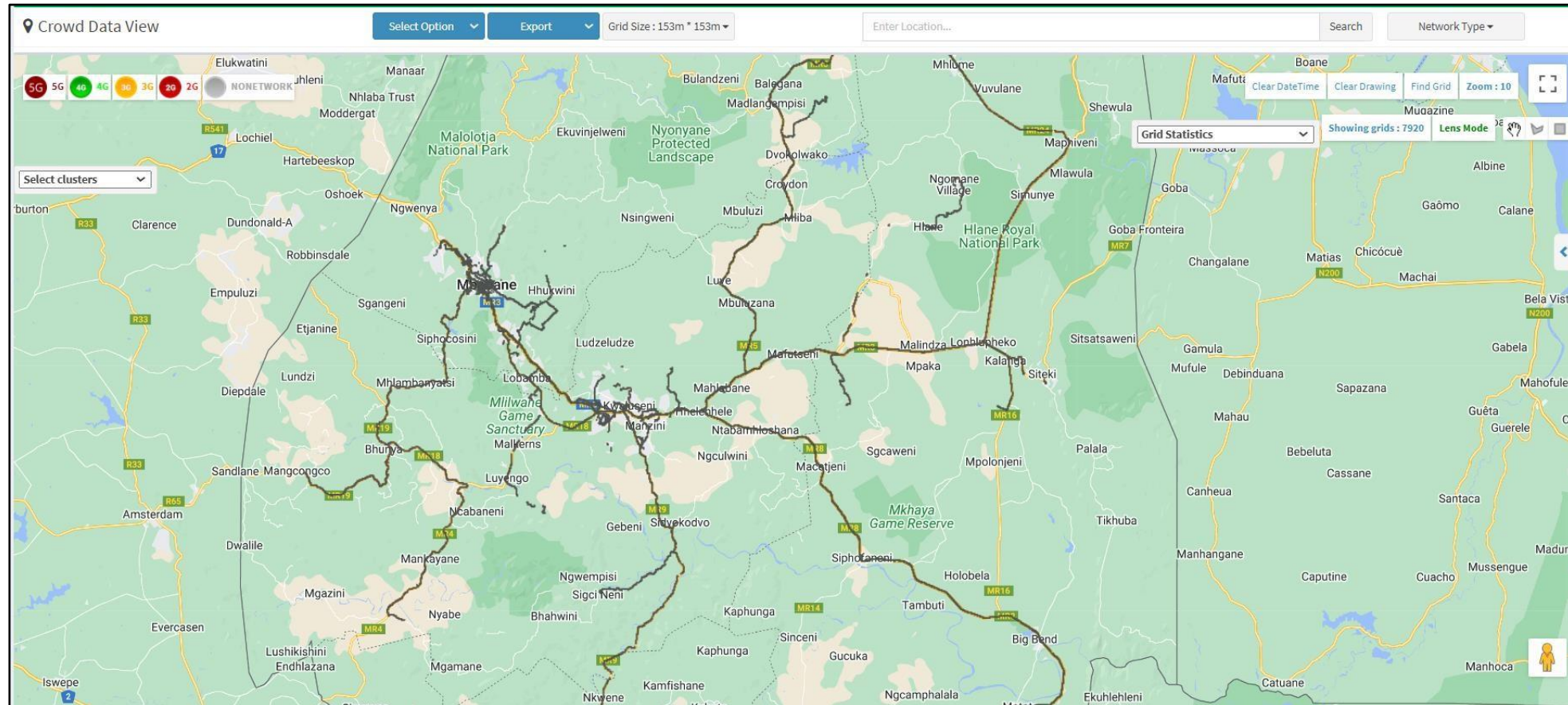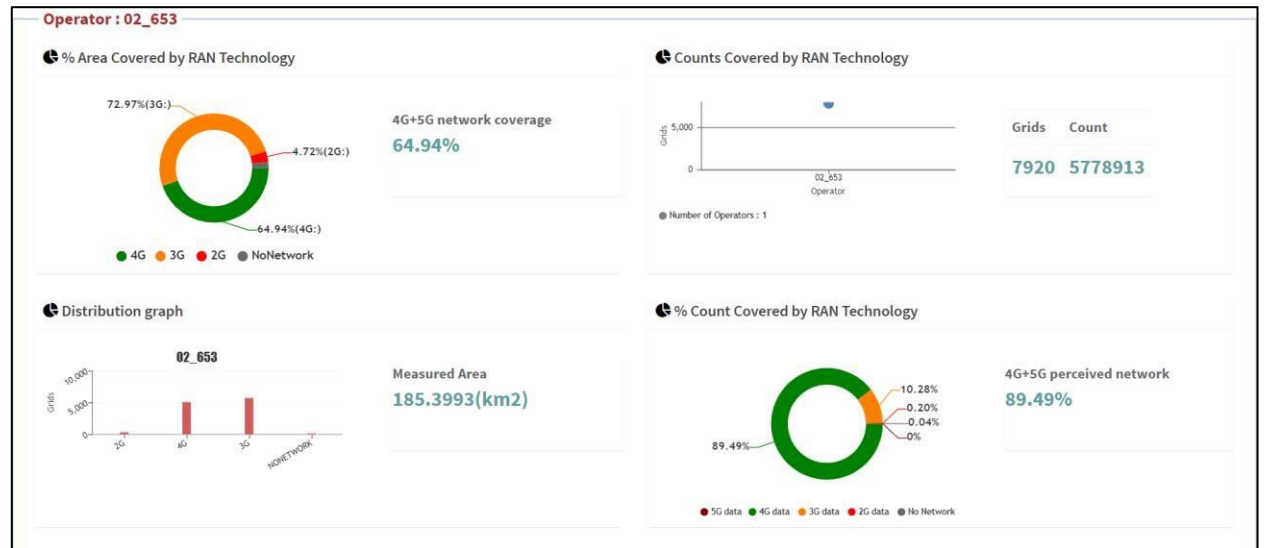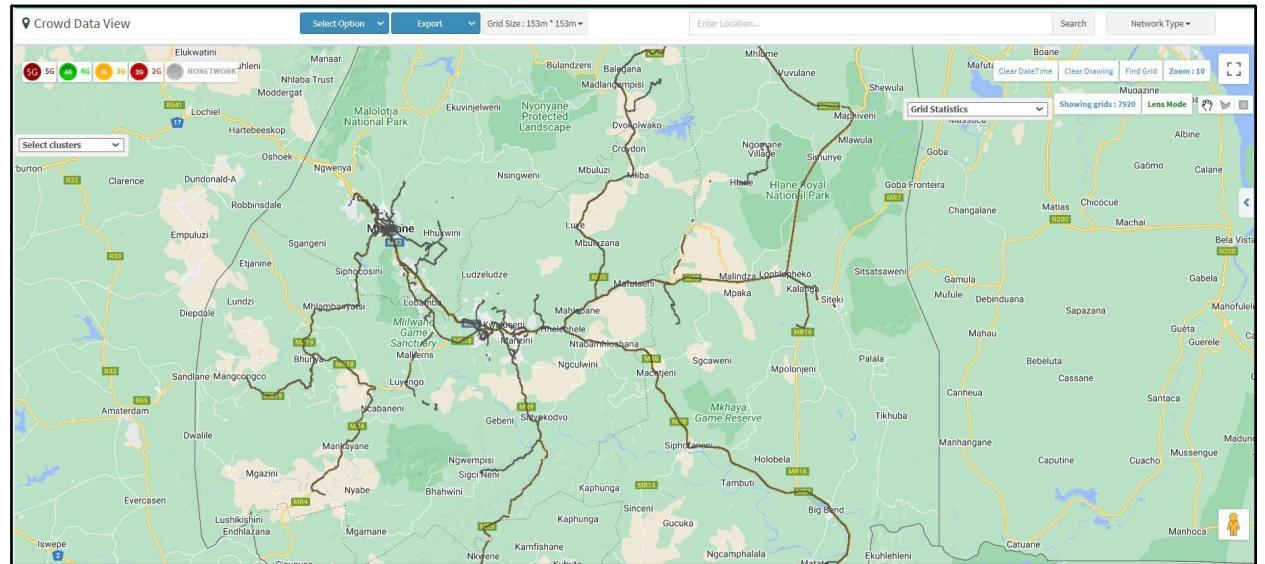
Network Type

Network Type defines the RAN Generation used for voice and data.
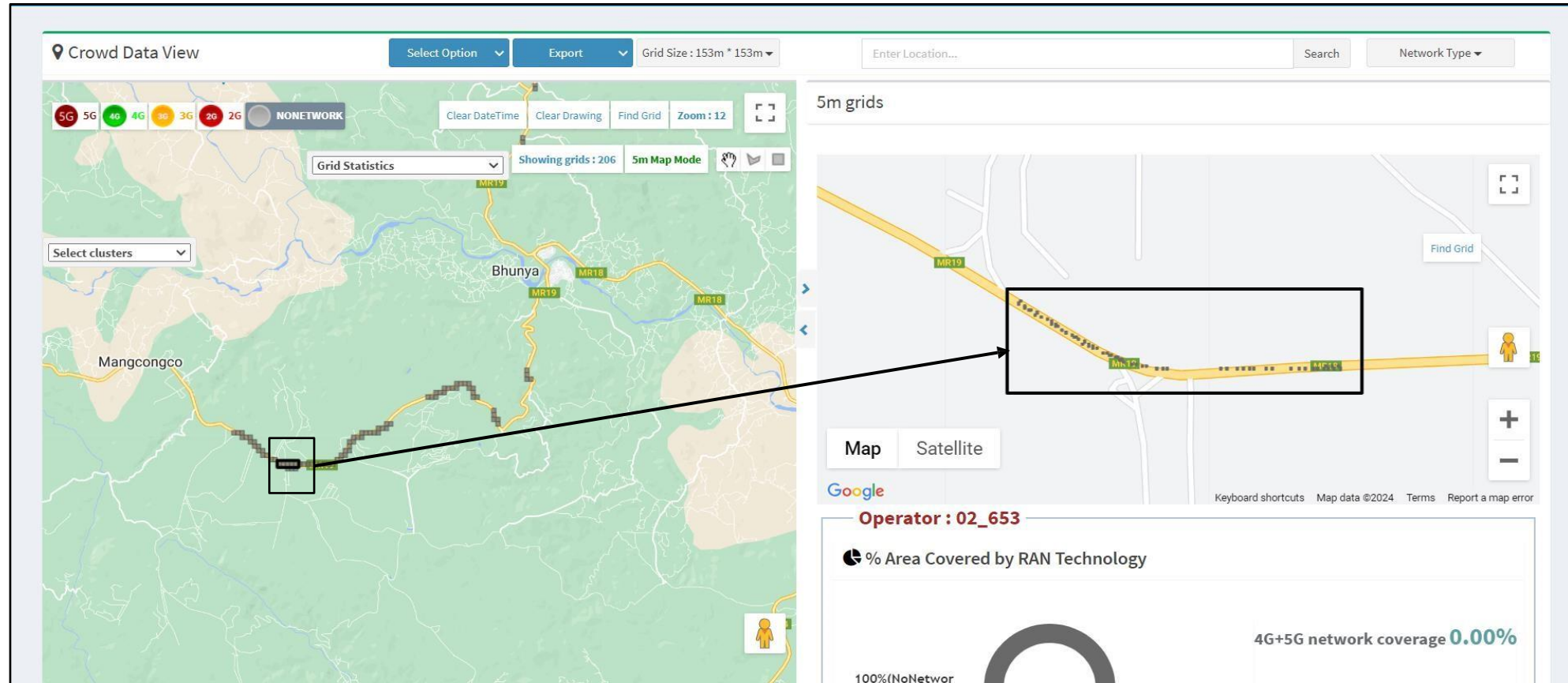
Observations and Comments:

- Noticed most of the time users experienced 4G and 3G networks. But for some time, users were on 2G(4.72%) and No Network (2.6%) which can be improved by optimizing the network for better experience.

Network Type

3G network coverage in Mbabane

Locations where users drop to 2G in Mbabane.

loss of network in these locations.

Some areas highlighted in the image have only a 3G network available. Future expansion of 4G needs to be considered if they are significant areas.

Network Type

Drill down view on locations where no network connectivity was noticed
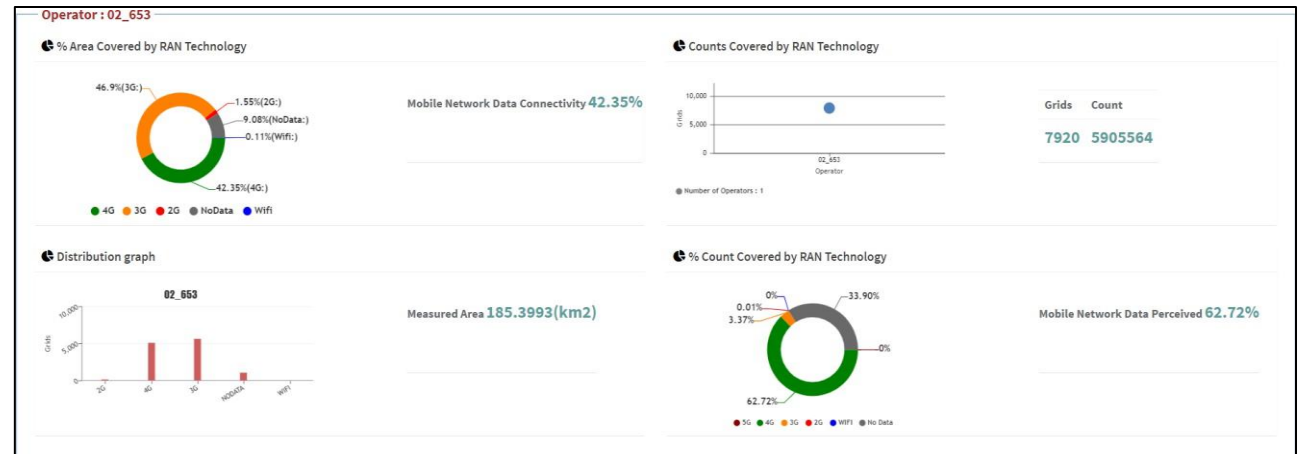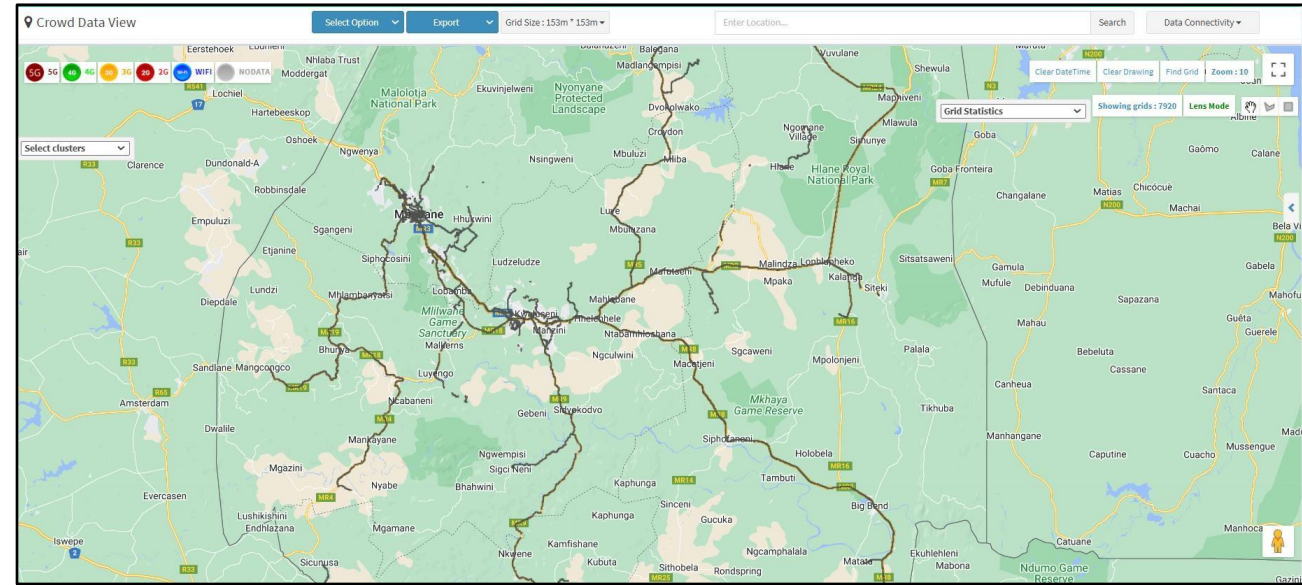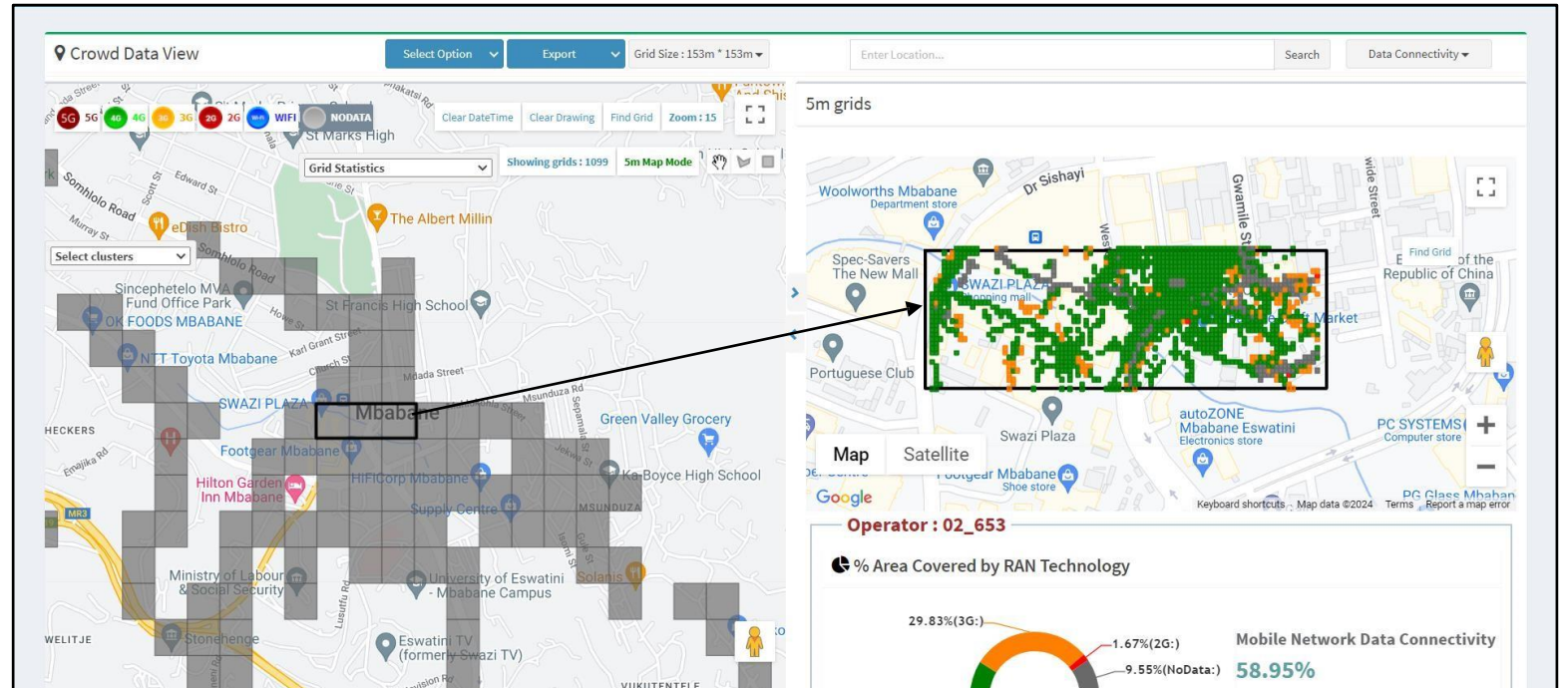
Data Type

Data Type defines the RAN generation type used for data connectivity

Observations and Comments:

- Noticed most of the time user experienced 4G and 3G network. But for some times user was on 2G(1. 55%) and about 9.08% of area did have data connectivity issue even though the network was there. This can be improved by optimizing the network for a better experience
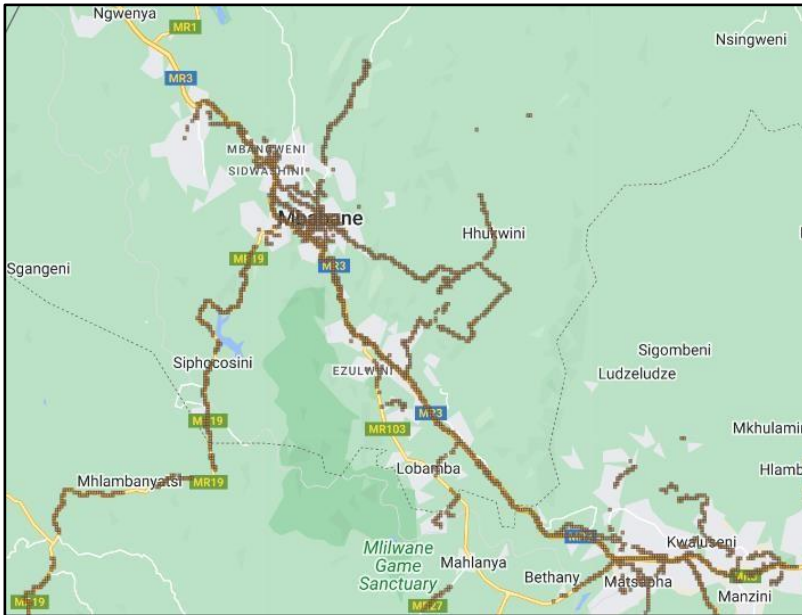
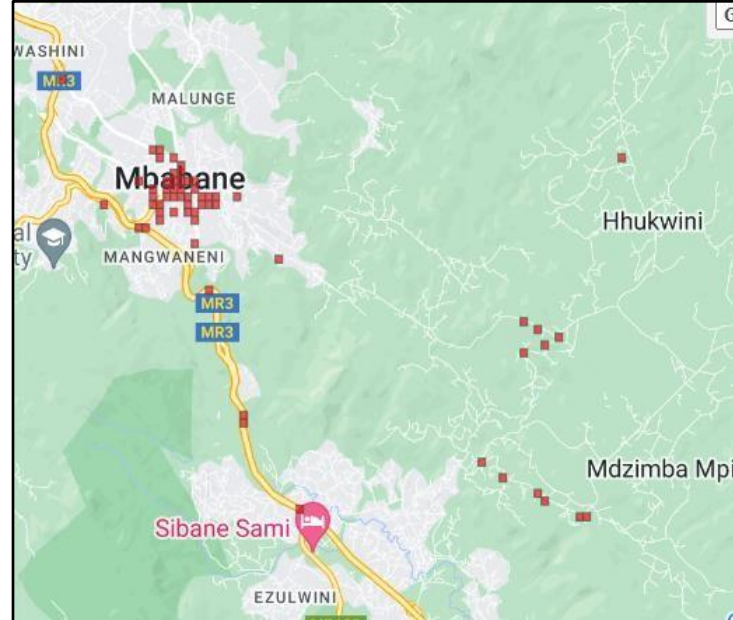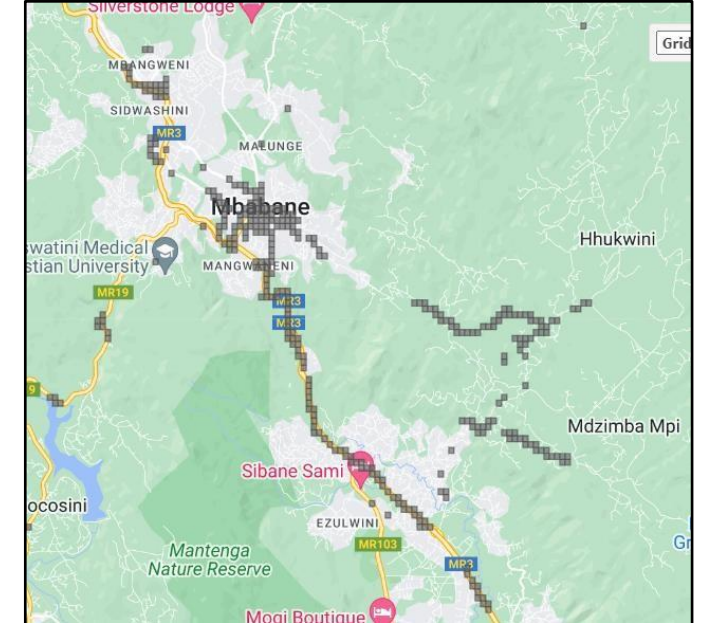# Worst location with data connectivity issue in Mbabane

Data Type

3G network coverage in Mbabane	Locations where users drop to 2G in Mbabane.	loss of network in these locations.

- Some areas highlighted in the image have only a 3G network available. Future expansion of 4G needs to be considered if they are significant areas.
  There are spots in Mbabane where there are data connectivity issues on mobile user.

- There is no 4G connectivity in the highlighted area on map.

RSRP

Reference Signal Received Power (RSRP) is a measure of the received power level in an LTE cell network commonly referred as 4G coverage

Observations:

- RSRP is overall good in all areas as you can see 28.76% of data samples are in the range (-90dBm to -99dBm)
- Average coverage areas have 41.05% in (-100dBm to -115dBm) and 11.89% of data samples are in the range(<= -116dBm)

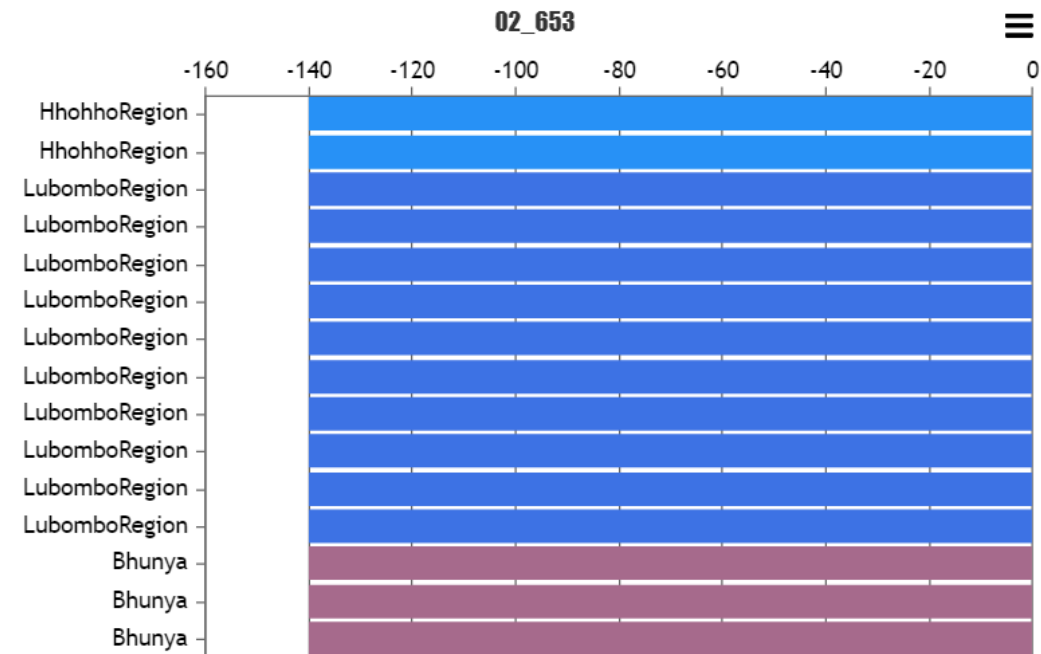| RSRP	Signal Quality	Description
>= -89 dBm	Excellent	Strong Signal with maximum data speed
Between -90 to -99 dBm	Good	Strong Signal with good data speed
Between -100 to -115 dBm	Fair	Reliable data speeds may be attained, But marginal data with drop outs is possible.when the value gets close to -100, Performance will drop drastically
<= -116 dbm	Poor	Disconnection/Poor coverage

- Red data points are shown in snap having poor coverage while Grey points indicate extremely poor coverage and needs to be improved; Possible reasons can be poor network coverage.

- Suggestions: Overall RSRP is poor across the covered area. Check and optimize the site if any implementation issues or also audit elevation and overshooting of neighbours cells.
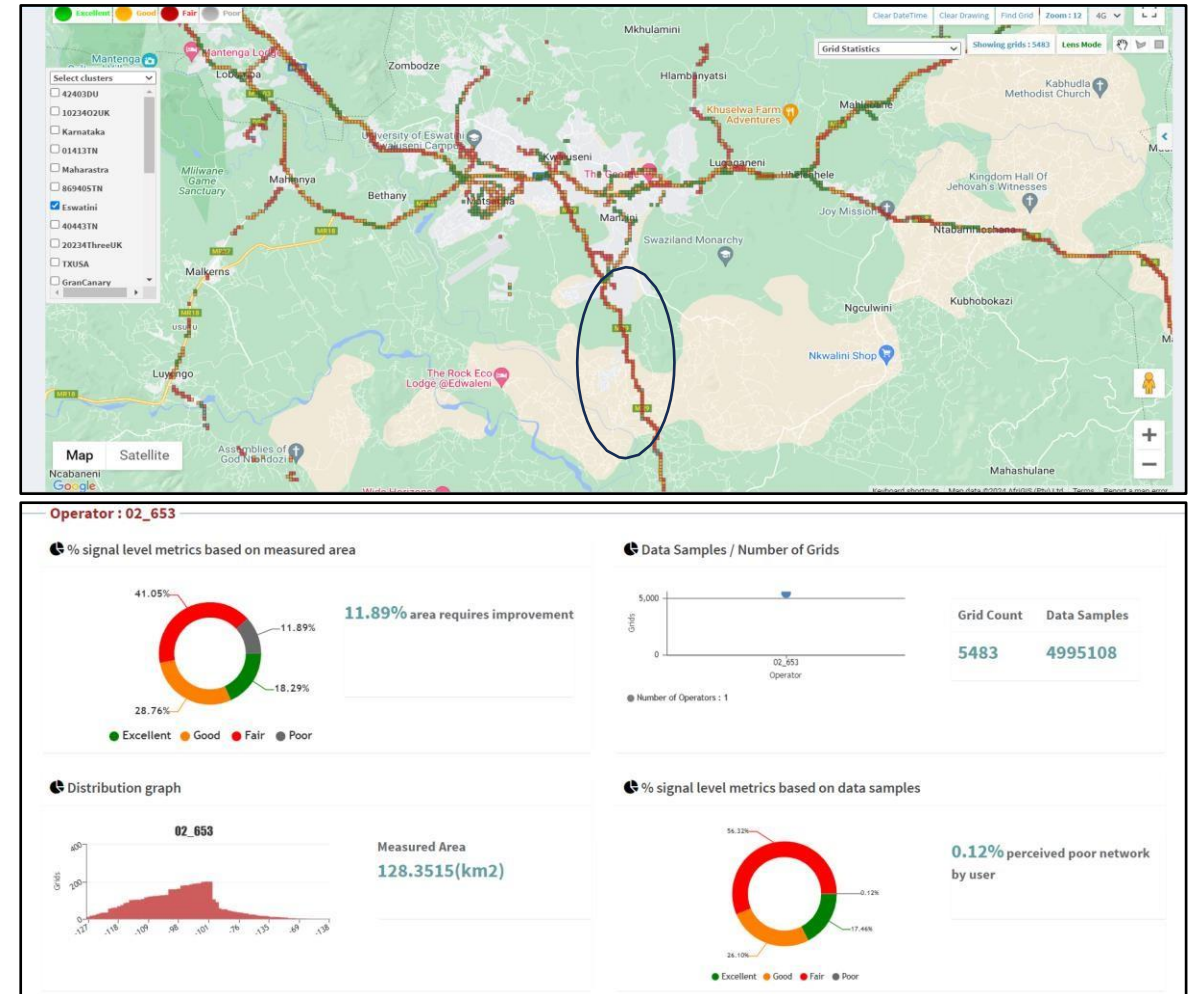
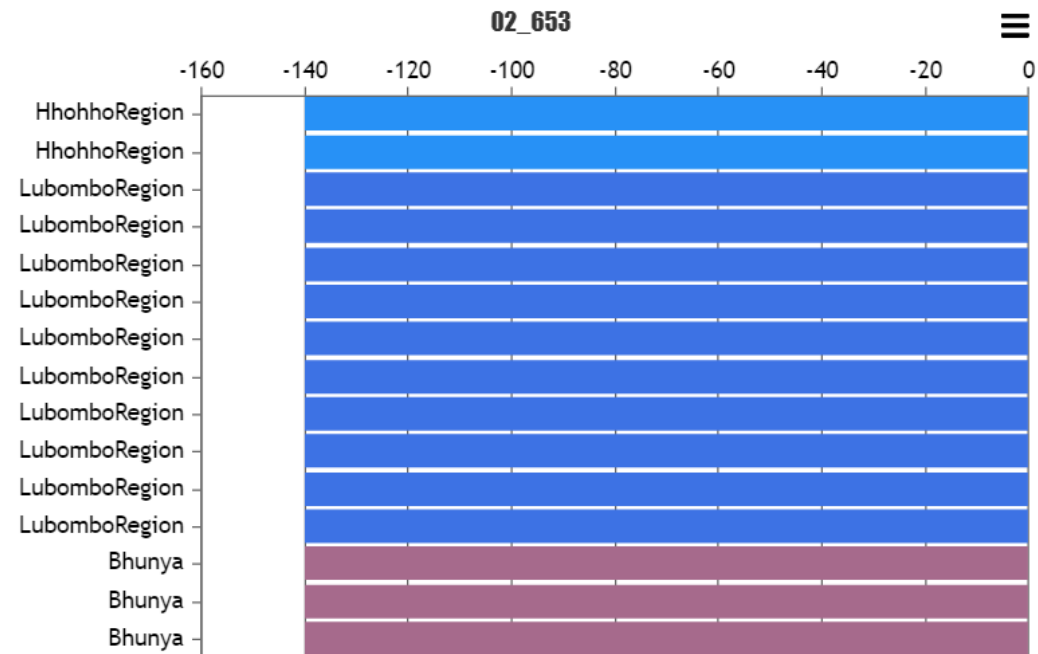# Top worst RSRP locations in Lubombo (needs improvement)

Top worst RSRP locations in Bhunya (needs improvement)

Top worst RSRP locations in Hhohho (needs improvement)

Top 15 Worst Signal Performing by Grid
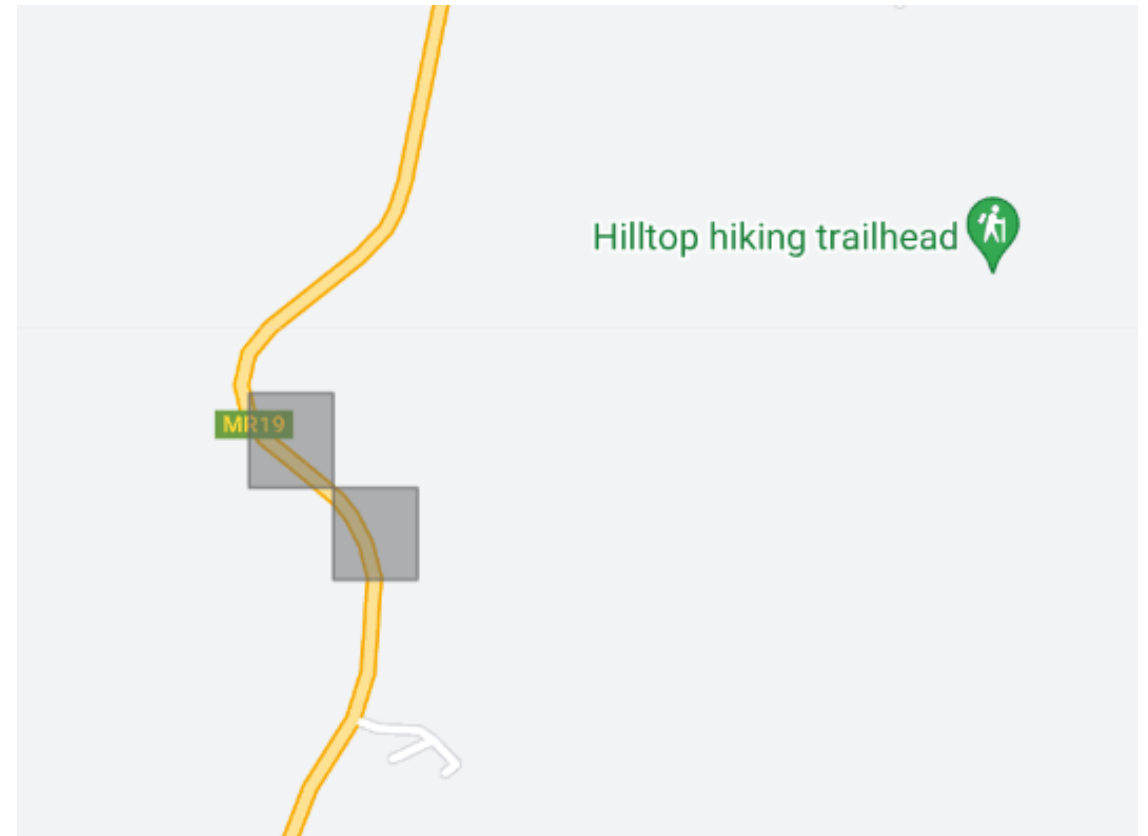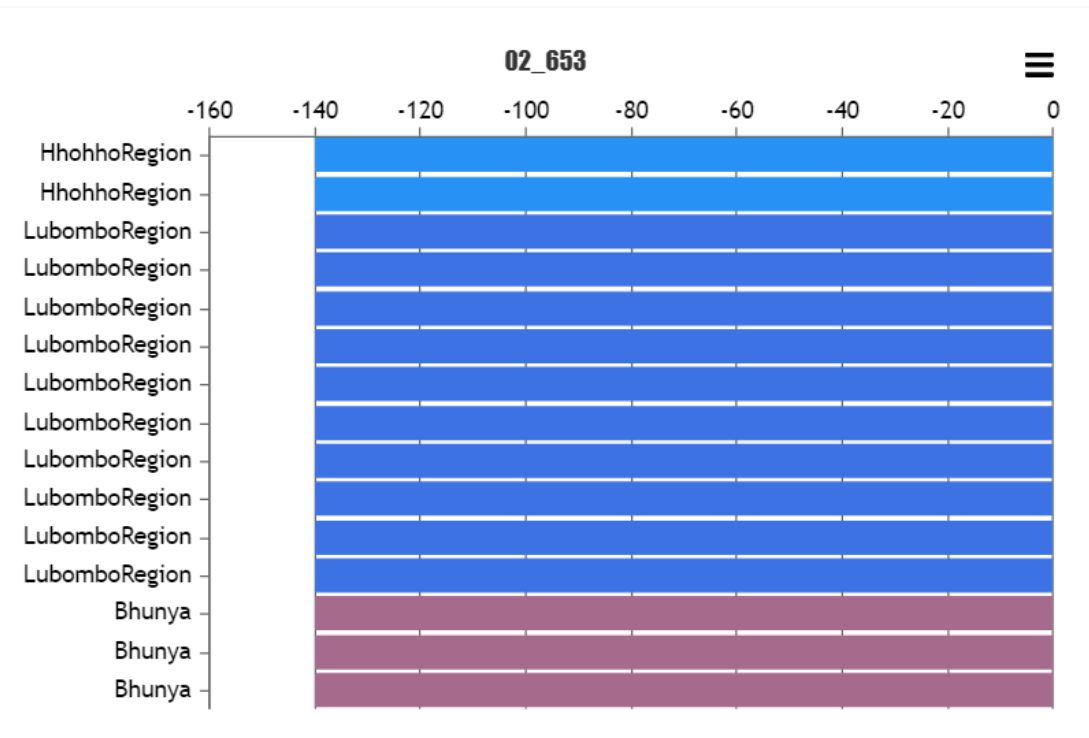
RSRQ

Reference Signal Received Quality (RSRQ) quantifies the quality of the received reference signal from the serving cell's base station (cell tower). commonly referred as 4G Quality
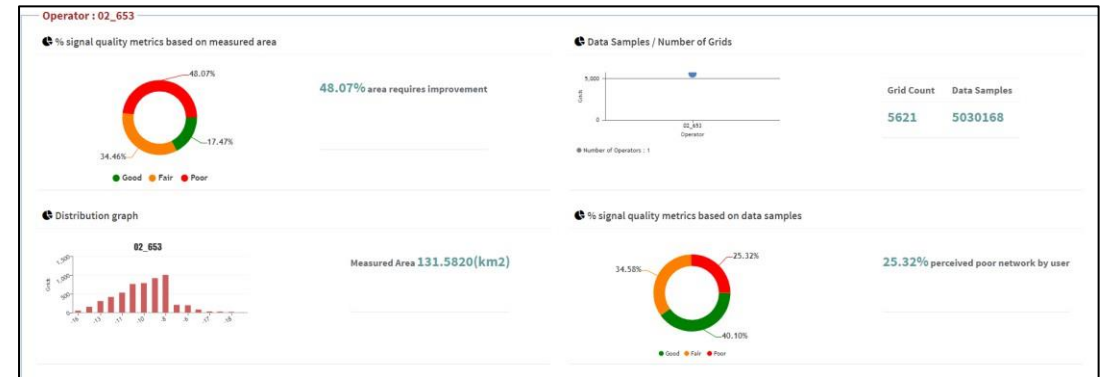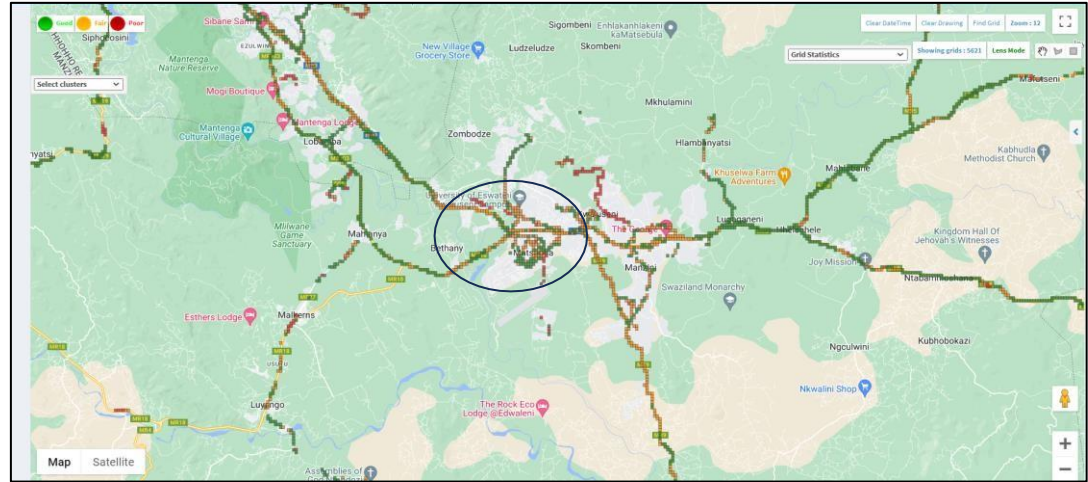
Observations:

- RSRQ is overall good in all areas as you can see 34.46% of data samples are in the range (-8 to -9 dBm)
- Poor coverage areas as you can see 48.07% of (<= - 10 dBm)

RSRQ	Signal Quality	Description
> -7 dBm	Excellent	Strong Signal with maximum quality
-8 to -9 dBm	Good	Strong Signal with good Quality
< -10 dBm	Poor	when the value gets close to -10 performance will drop drastically

- Red data points are shown in the snap as having poor coverage and need to be improved; Possible reasons can be poor network coverage.
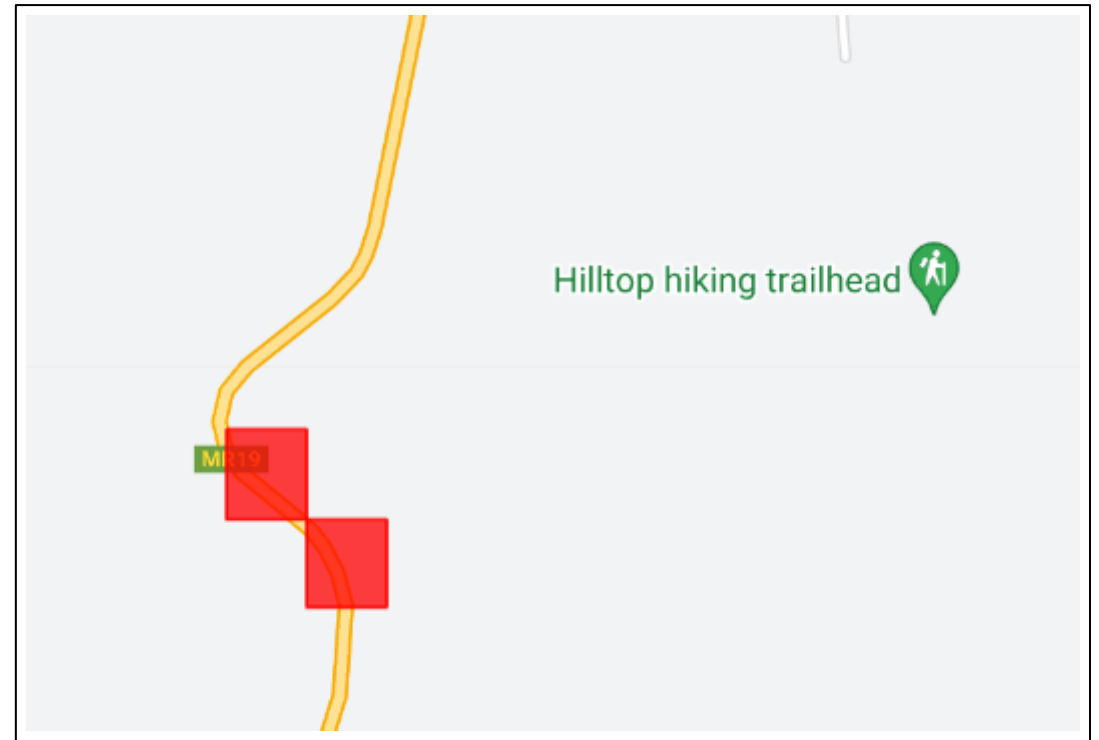
  Suggestions: checking and optimizing the site if any implementation issue Or also can audit elevation and overshooting of neighbours' cells.
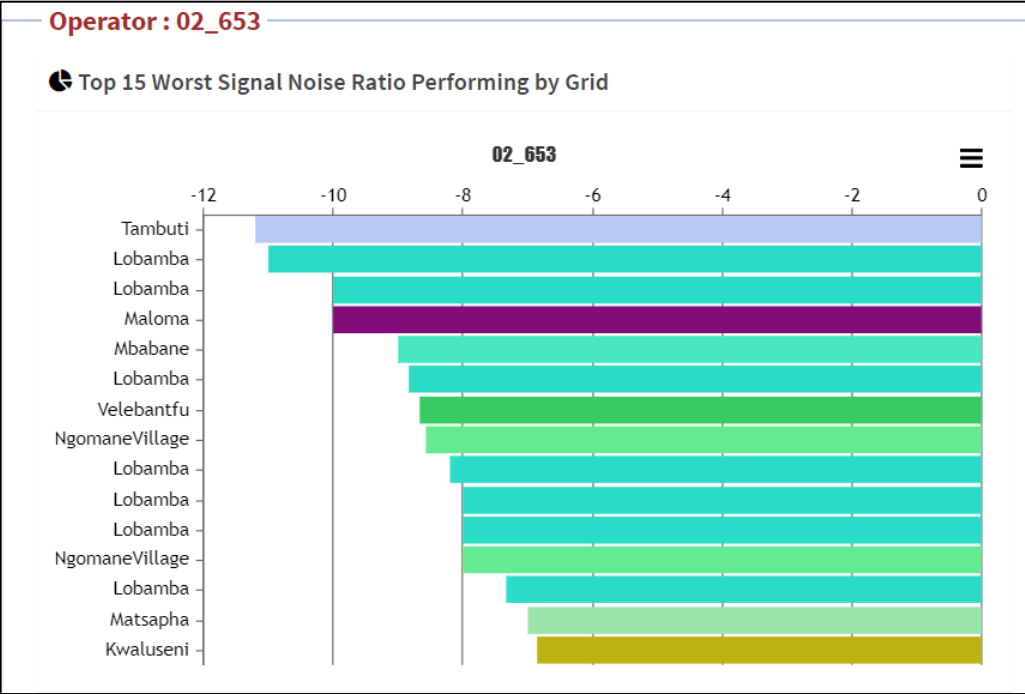
Top worst RSRQ locations in Lobamba
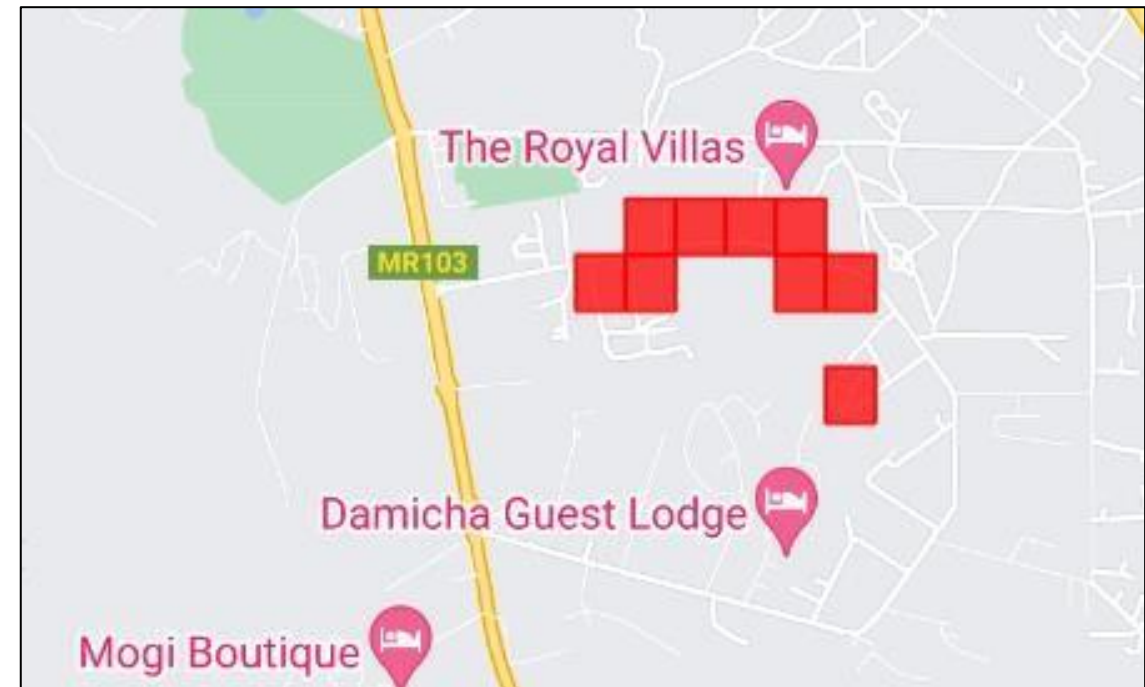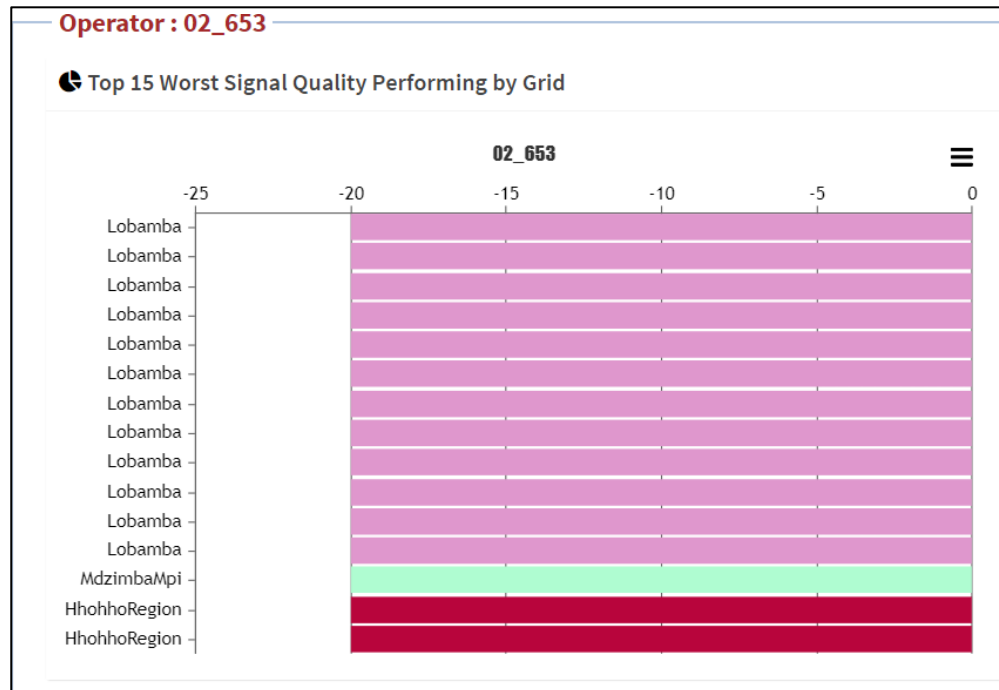
Top worst RSRQ locations in Hhohho (needs improvement)

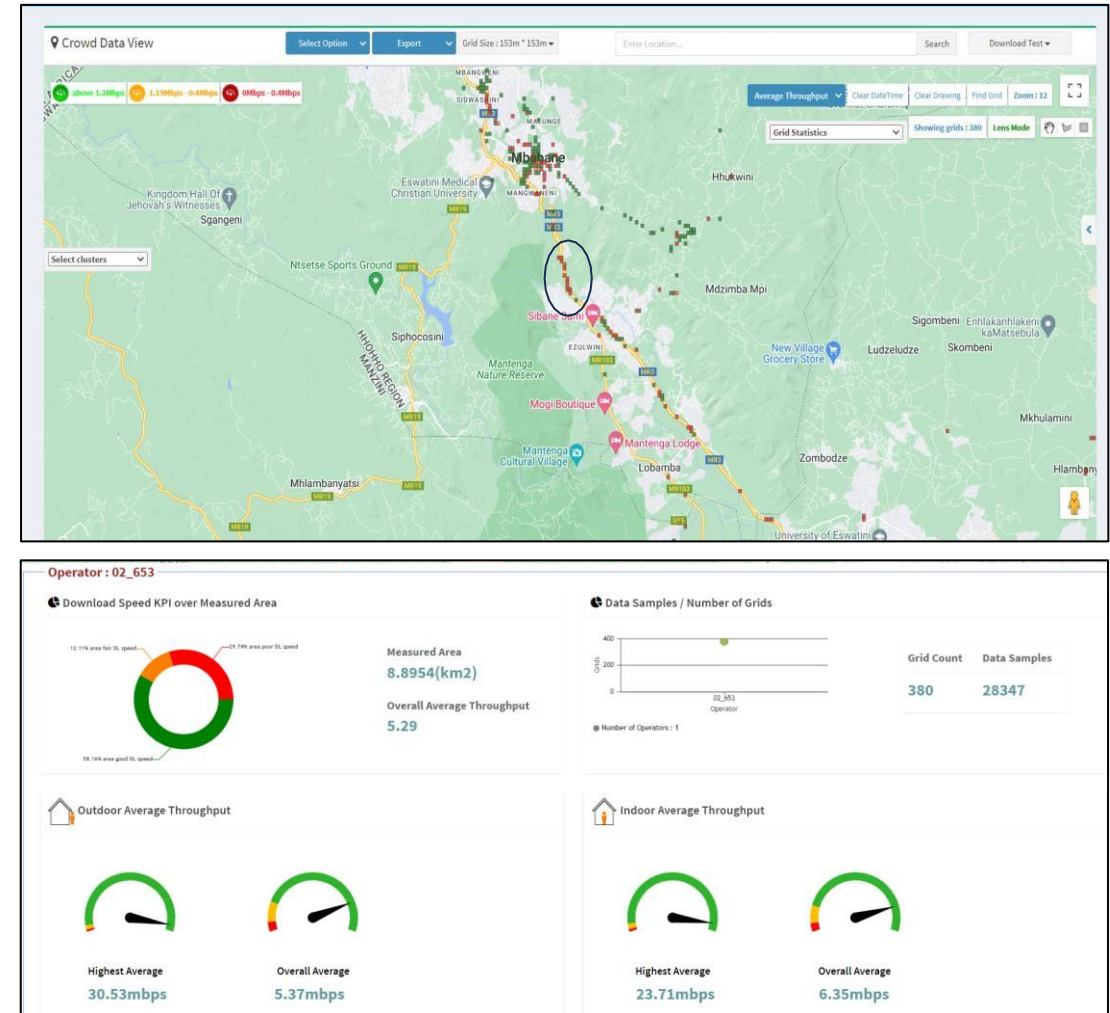# Top worst SNR location with -7dbm in Matsapha

Download Test

Observations:

- Overall user experienced a 5.29mbps average throughput.
- Noticed most of the time user experience good throughput.
- In some locations poor throughput observed
- Red Locations need to be improved; Possible reasons can be poor network coverage.
- DL throughput is overall good in all areas as you can see 58.16%
  of data, samples are in the range (>= 1.20 Mbps).
- Low throughput areas as you can see 12.11% of data are in the range (1.19 to 0.40 Mbps) and 29.74% of data are in the range (<=0.39Mbps) and require improvement.

Suggestions: Check and optimizing the site if any implementation issue Or also can audit elevation and overshooting of neighbours' cells.

Upload Test

Upload speed is measured using the nearest available server. The upload speed is how fast you send data from you to others

Observations:

- Overall user experienced a 5.86 average throughput.
- Noticed most of the time user experience good throughput.
- In some locations poor throughput observed
- Red Locations need to be improved; Possible reasons can be poor network coverage.
- UL throughput is overall good in all areas as you can see 77.04% of data samples are in the range (>= 0.50mbps).
- Low throughput areas as you can see 7.12% are in the range (0.49 and 0.20mbps)and 15.83% are in the range (<= 0.19) and require improvement.

Suggestions: checking and optimizing the site if any implementation issue Or also can audit elevation and overshooting of neighbours' cells.
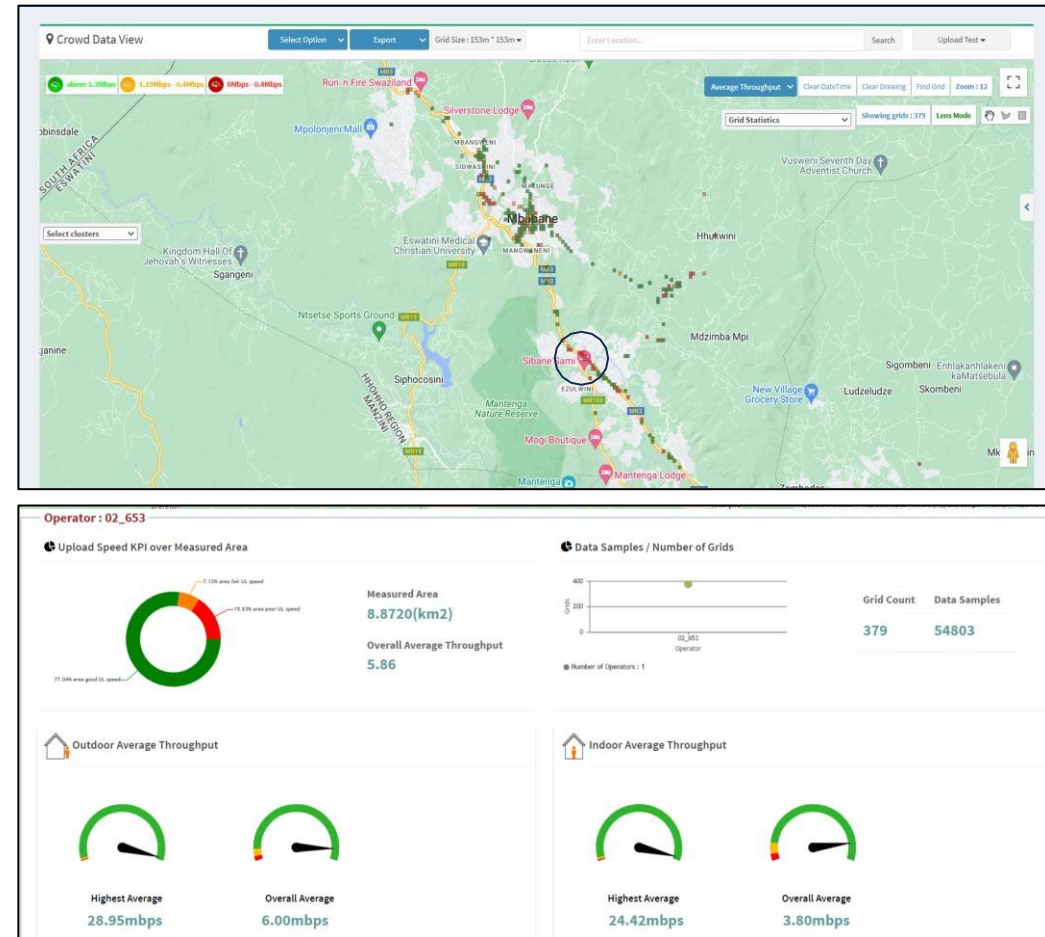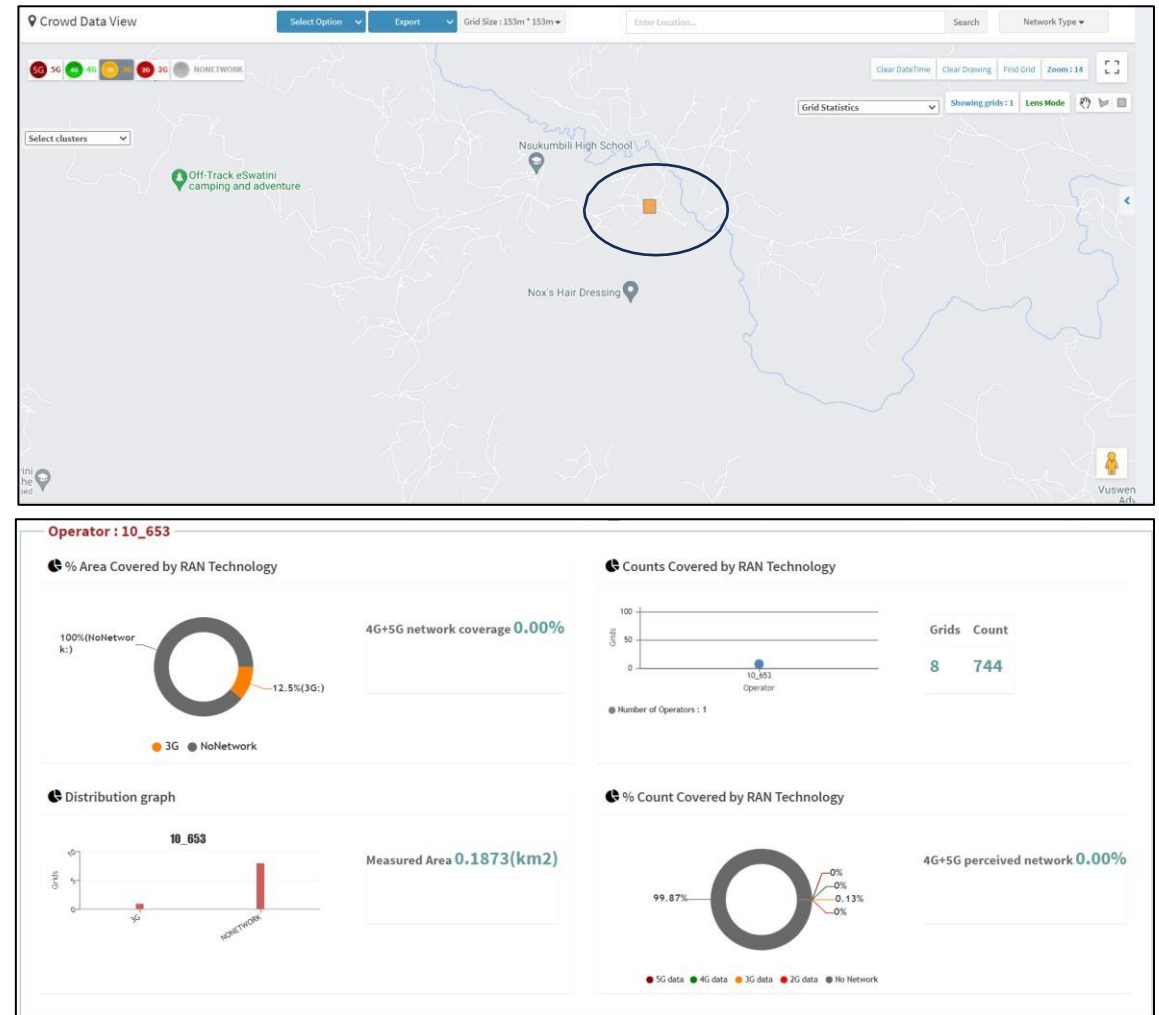
Network Type

Network Type defines the RAN Generation used for voice and data.
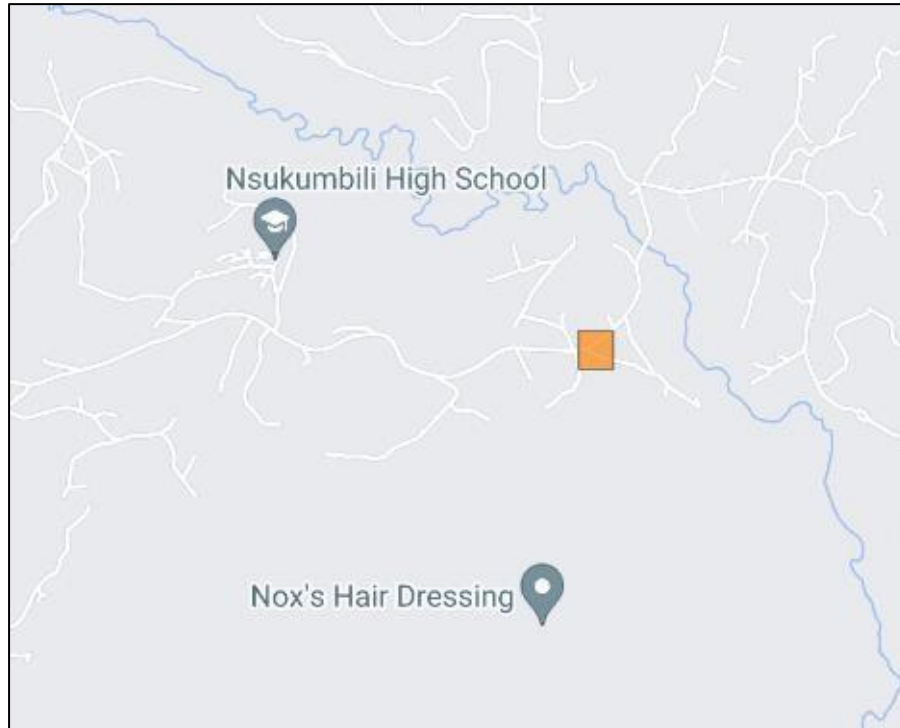
Observations and Comments:

Noticed most of the time users experienced 3G and NO network. But for some times, users were on 3G (12.5%) and No Network (87.5%) which can be improved by optimizing the network for better experience.

Some areas highlighted in image have only 3G network available. Future expansion of 4G needs to considered if they are significant areas.
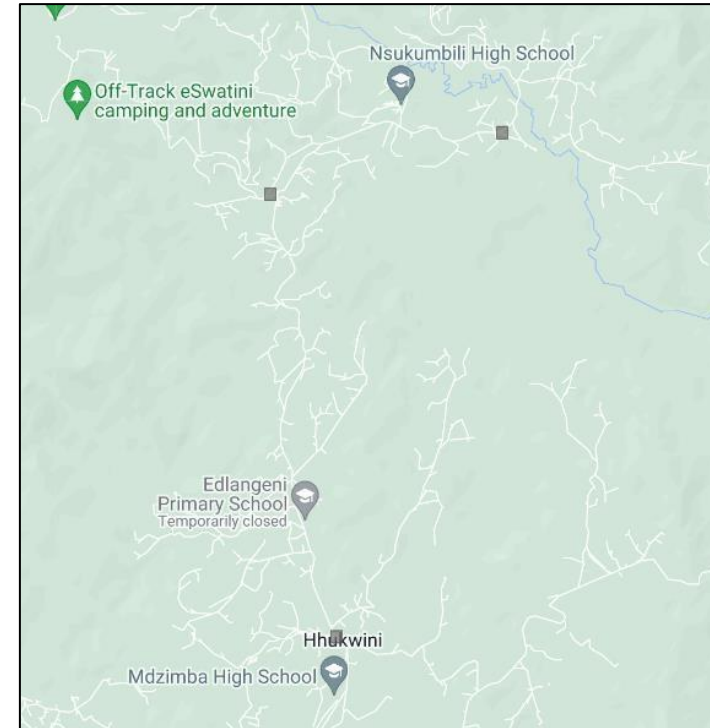
Network Type

3G network coverage in Mbabane
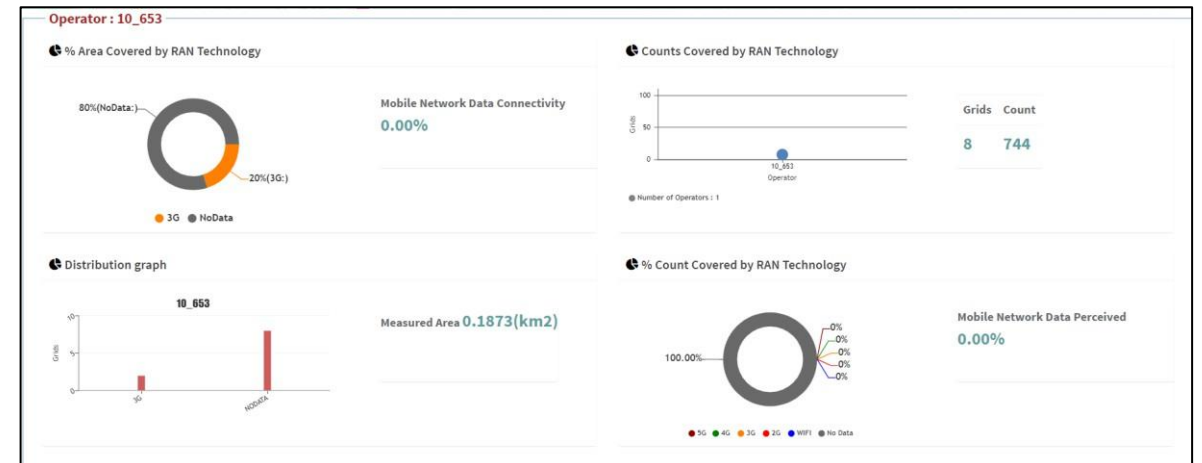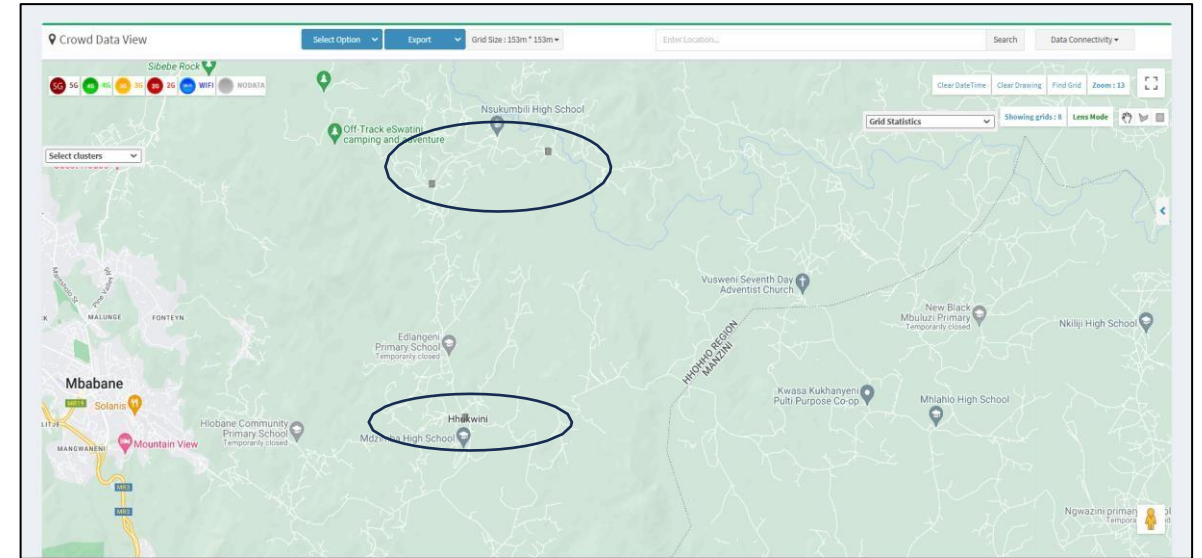

Loss of network in these locations

Data Type

Data Type defines the RAN generation type used for data connectivity

Observations and Comments:

- Noticed most of the time user experienced 3G and No data. But for some times user was on 3G(20%) and about 80% of area did have data connectivity issue even though the network was there. This can be improved by optimizing the network for better experience

- There are spots in Mbabane where there are data connectivity issues on mobile user.

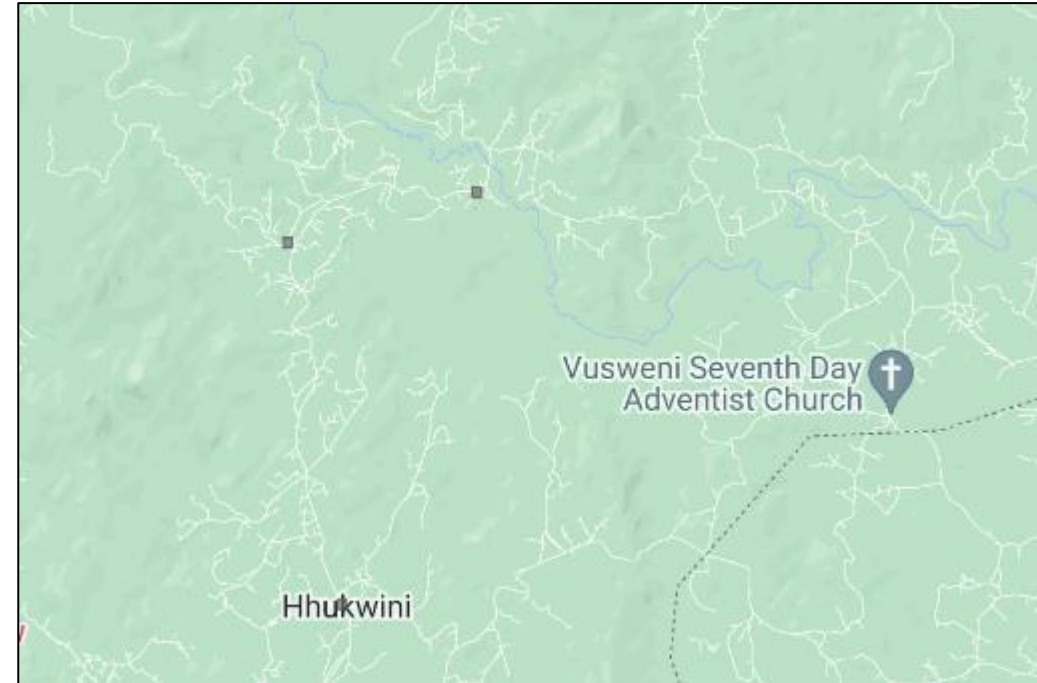- There is no 4G connectivity in the highlighted area on map.

Data Type:

3G Data in Mbabane
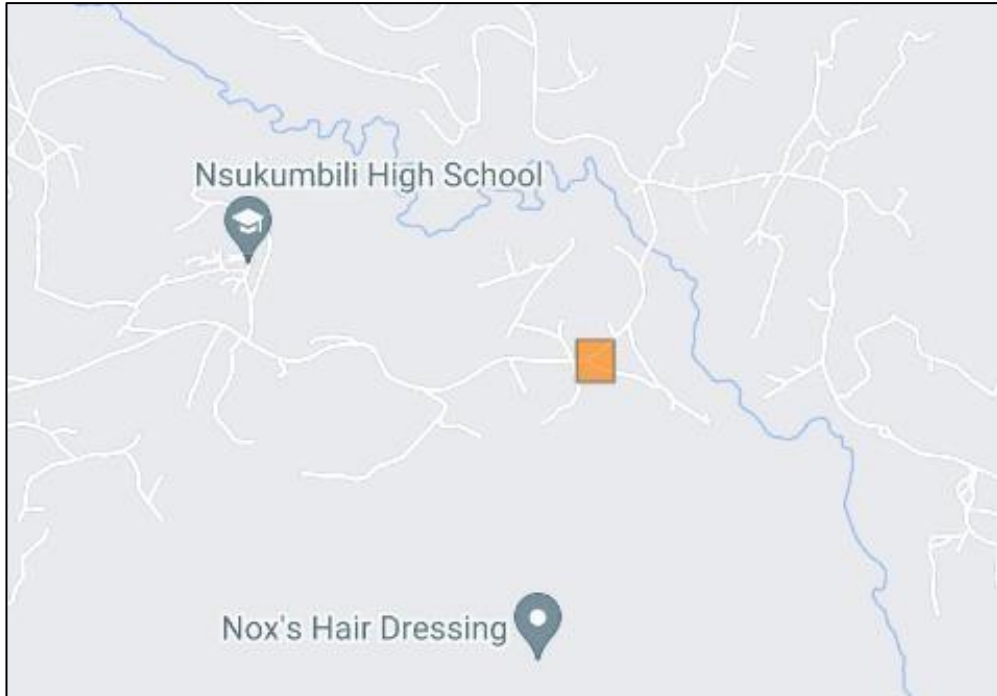
Loss of network in these locations

RSCP

Received Signal Code Power (RSCP) denotes the power measured by a receiver on a particular physical
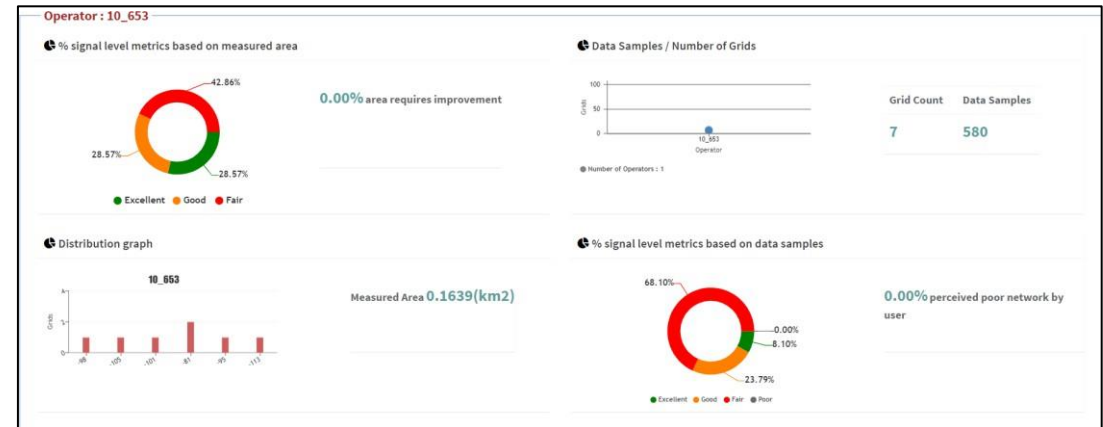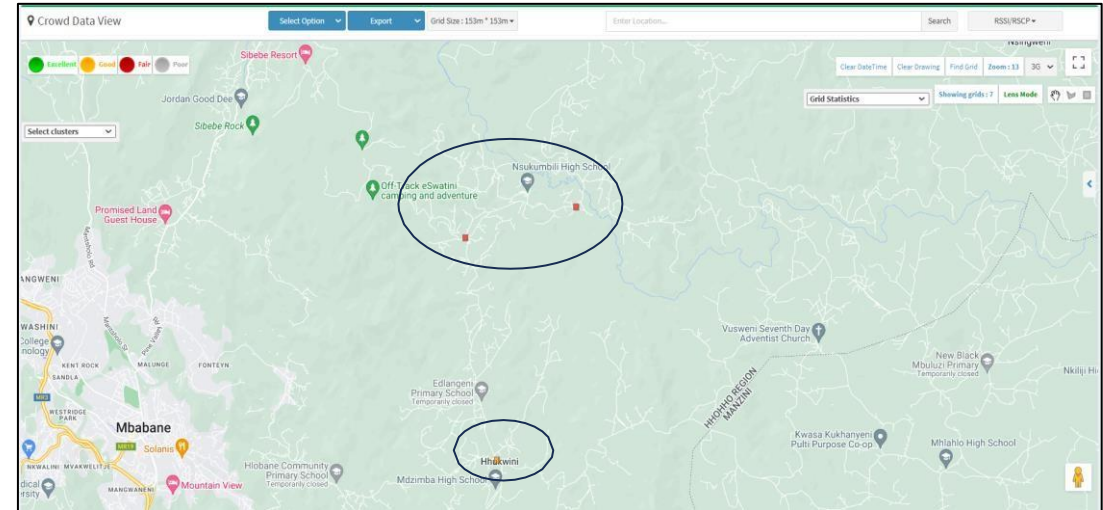communication channel in a 3G cell network commonly referred as 3G coverage

Observations:
RSCP is overall good in all areas as you can see 28.57% of data samples are in the range (>= -89 dBm)
Average coverage have 28.57% in (-90dBm to -99dBm) and 42.86% of data samples are in the range(-100Bm to -115dBm)
Red data points are shown in snap having poor coverage needs to be improved; Possible reasons can be poor network coverage.
Suggestions: checking and optimizing the site if any implementation issue Or also can audit elevation and overshooting of neighbours' cells.

Received Signal Code Power (RSCP) denotes the power measured by a receiver on a particular physical
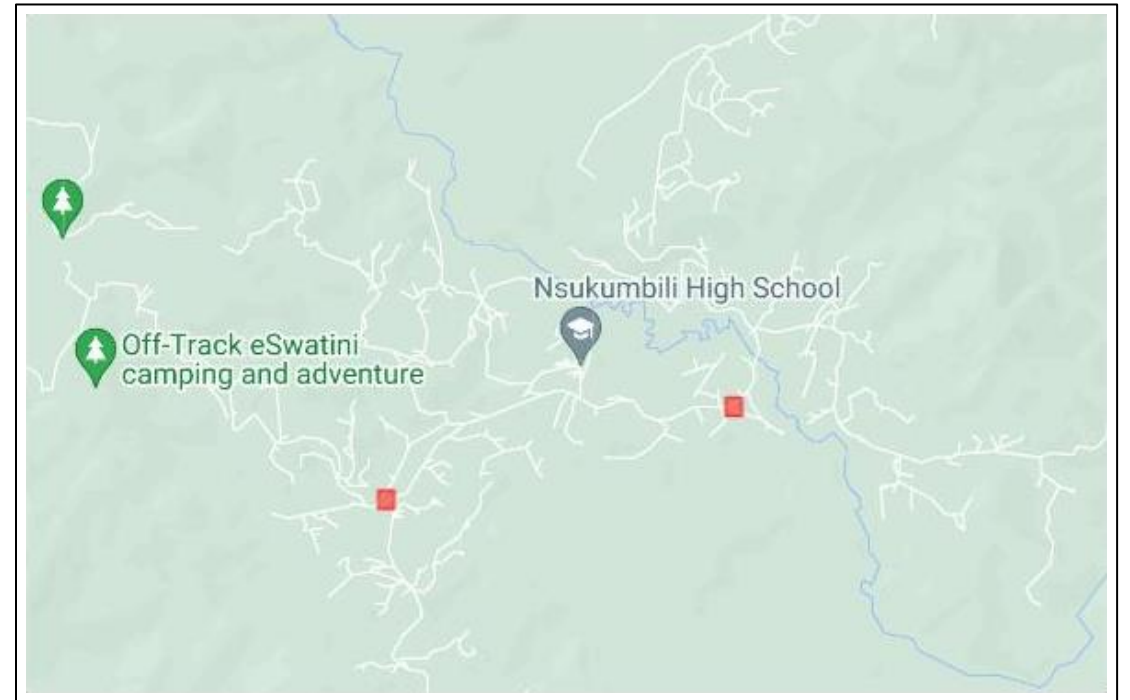communication channel in a 3G cell network commonly referred as 3G coverage
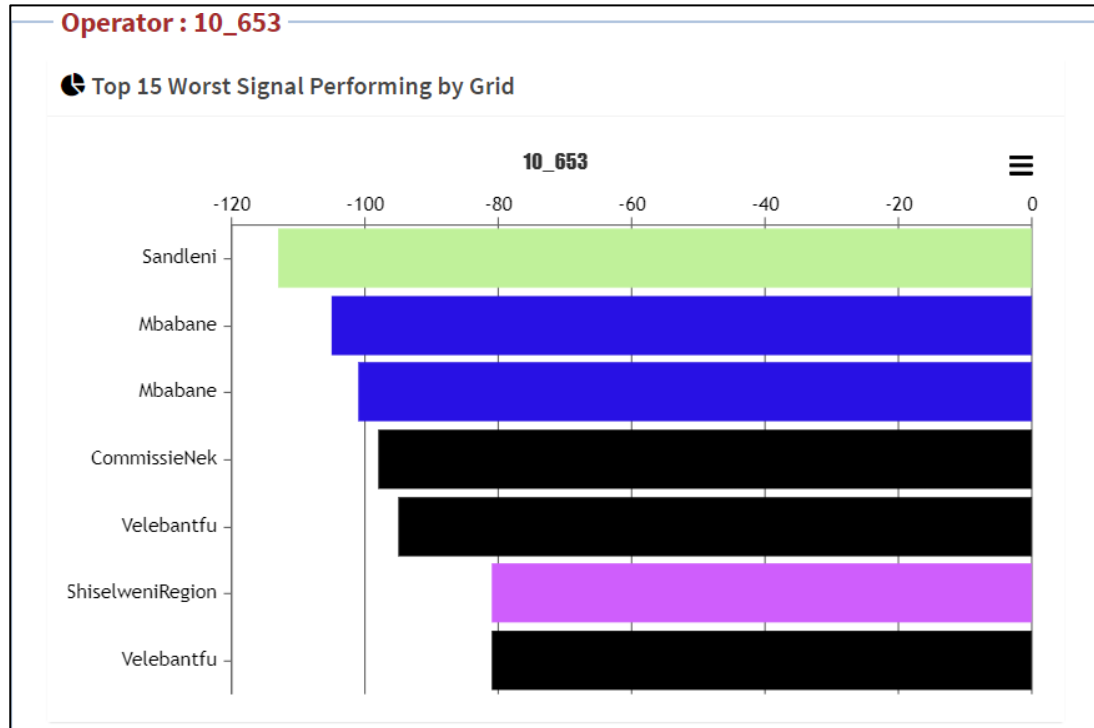
Observations:
RSCP is overall good in all areas as you can see 28.57% of data samples are in the range (>= -89 dBm)
Average coverage have 28.57% in (-90dBm to -99dBm) and 42.86% of data samples are in the range(-100Bm
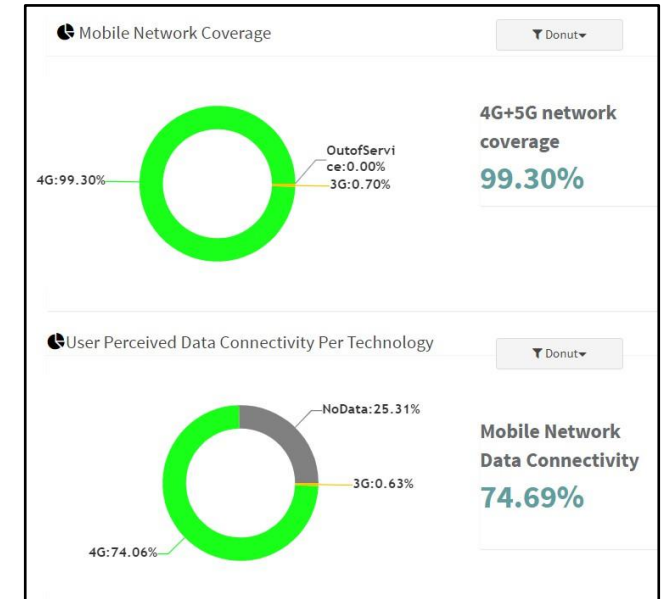to -115dBm)
Red data points are shown in snap having poor coverage needs to be improved; Possible reasons can be poor network coverage.
Suggestions: checking and optimizing the site if any implementation issue Or also can audit elevation and overshooting of neighbours' cells.
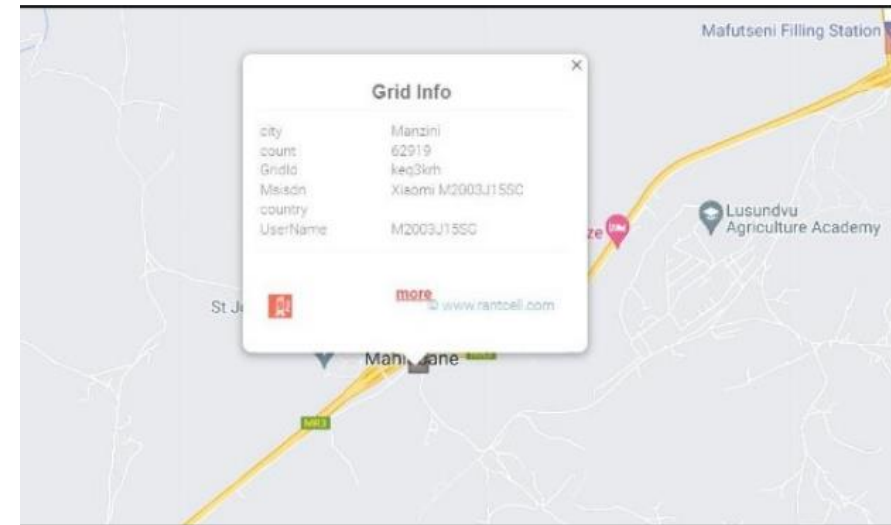
Top worst RSCP locations in Mbabane

Worst User

User Experience on Network

MSISDN : Xiaomi M2003J15SC

UserName :

Device Model : Xiaomi_M2003J15SC

Home Network : 653_02

Network Scoring : 48/55 ❓

Scoring computed duration days: 61.00

User Satisfaction: 😐

ActivePassive

0 dBm — Average ssRSRP — 5G

-87 dBm — Average RSRP — 4G

-86 dBm — Average RSCP — 3G

OutCall Count **0**

InCall Count **0**

Mobile Network Coverage — Donut

4G:99.30% OutofService:0.00% 3G:0.70%

4G+5G network coverage **99.30%**

User Perceived Data Connectivity Per Technology — Donut

NoData:25.31% 3G:0.63% 4G:74.06%

Mobile Network Data Connectivity **74.69%**

Observations:

- -38611650-114-45-75546-41-370-9610735-5893125-75128-951197-857378-118-491144052_Xiaomi M2003J15SC.

- The above user is the worst user because the user had no mobile data connectivity at the most lived location.
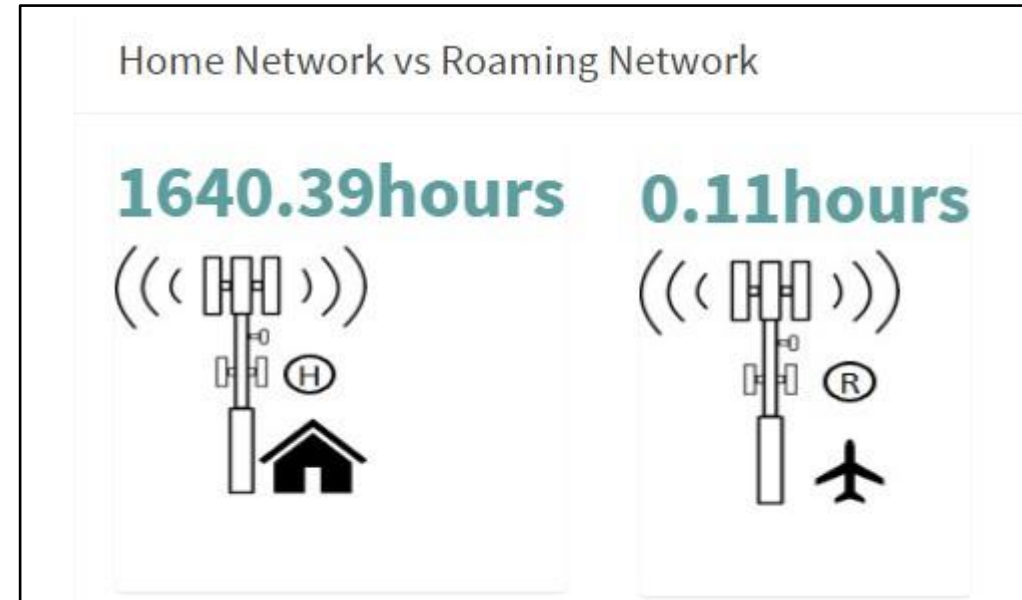
Grid Info

city	Manzini
count	62919
GridId	keq3krh
Msisdn	Xiaomi M2003J15SC
country	
UserName	M2003J15SC

more
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Overall summary for 6 users' data

- Average signal level for LTE is -97 dbm which needs to be improved.
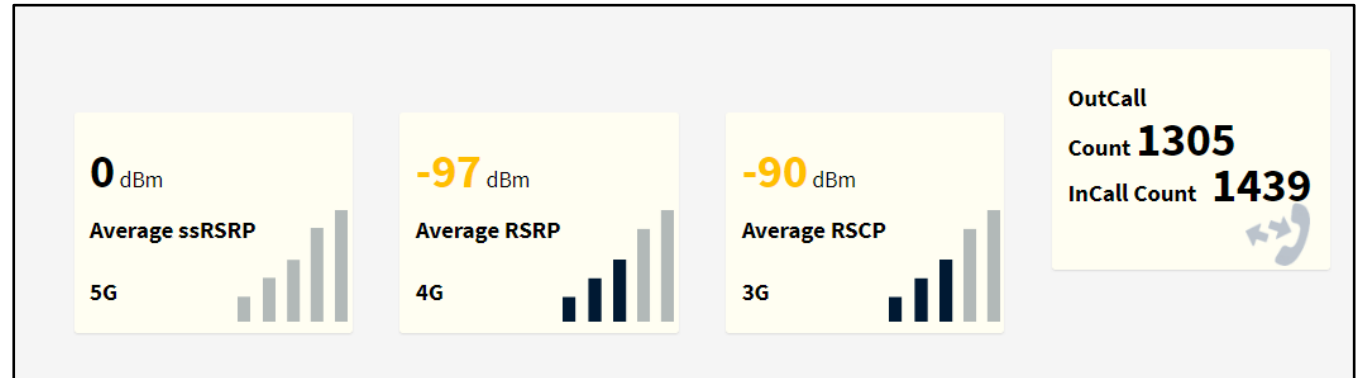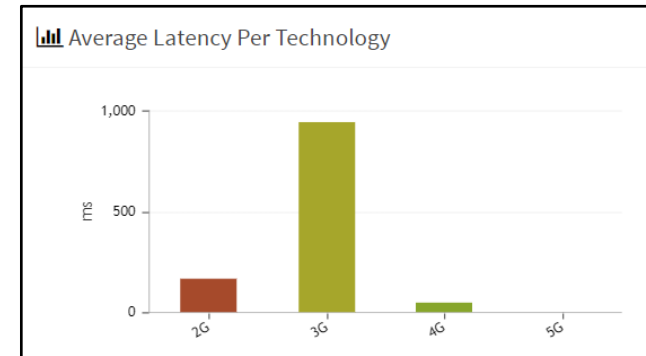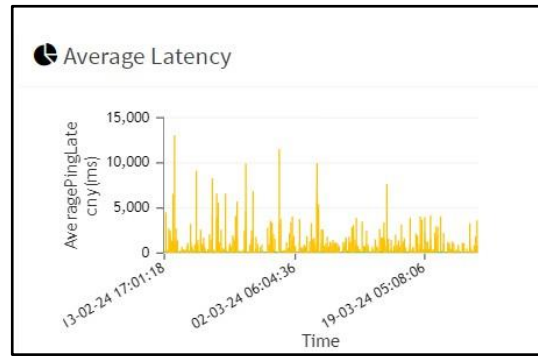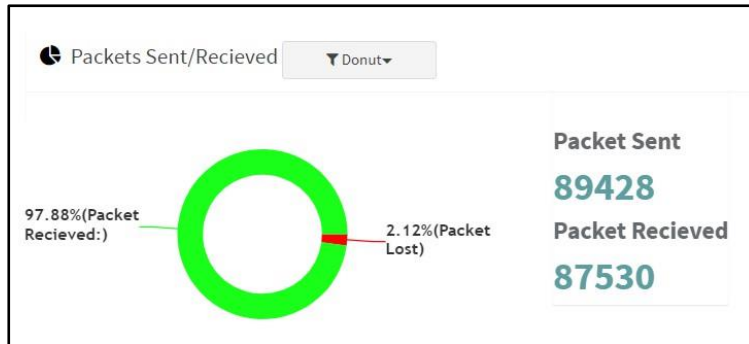
Overall summary for 6 users' data

Observed roaming scenario

Home Network vs Roaming Network

1640.39hours (H) 🏠

0.11hours (R) ✈

Overall summary for 6 user's data

Most of the time users remained outdoors

Indoor vs Outdoor

17.45%	82.55%
292.33 hours	1382.80 hours

Overall summary for 6 users data

Average latency is about 158 ms which is higher side, this is mainly due to when user's drop to 3G impacting average latency figure. While 4G network latency is around 51ms.

Overall summary for 6 users data


Majority of the mobile data downloads uploads are on the 4G LTE network.

DL data volumes — Donut▾

4G:98.55%   2G:0.00%   3G:1.45%

Total DL
151955.84mb

5G DL
0.00mb

UL data volumes — Donut▾

4G:98.35%   2G:0.00%   3G:1.64%

Total UL
92124.49mb

5G UL
0.00mb
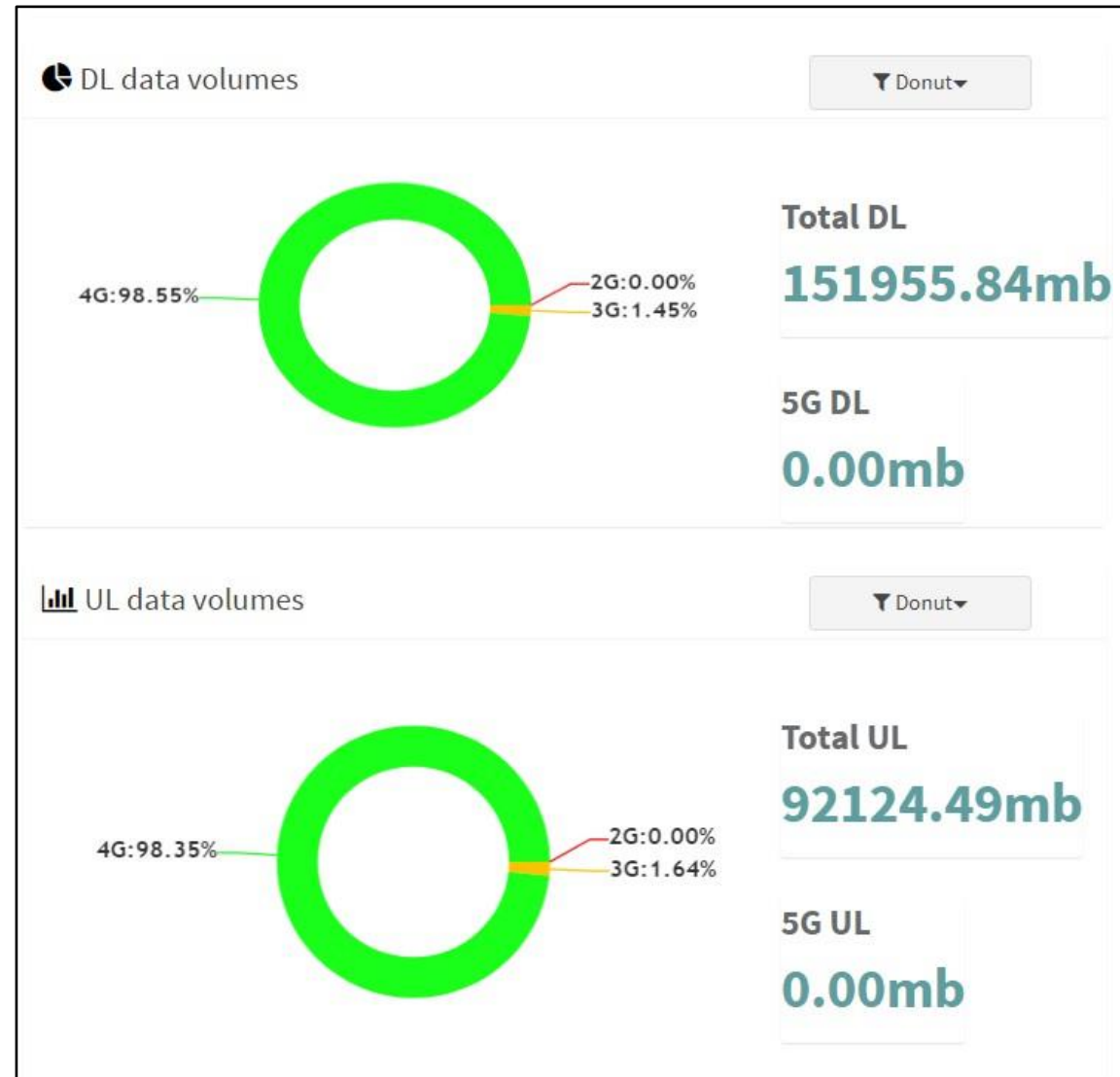
Overall summary for 6 users data

For about 11% of the time users rely on 3G network for voice and data service as on today. User experience can be improved by reducing this percentage.
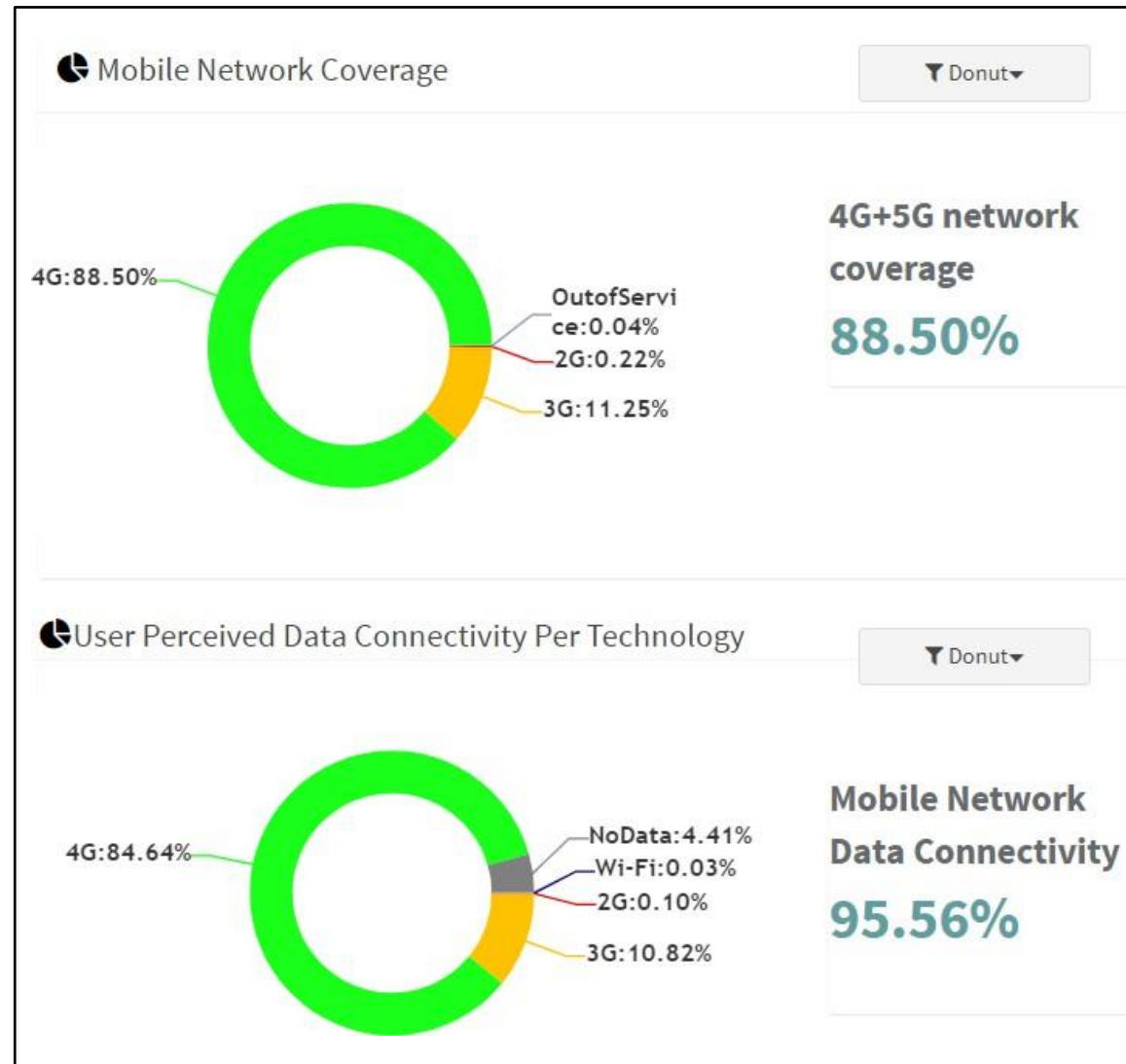
Overall summary for 6 users data

Highest peak throughput measured for Uplink and Downlink.

Mobile Network Peak Throughput

DL 119.57Mbps

UL 49.66Mbps
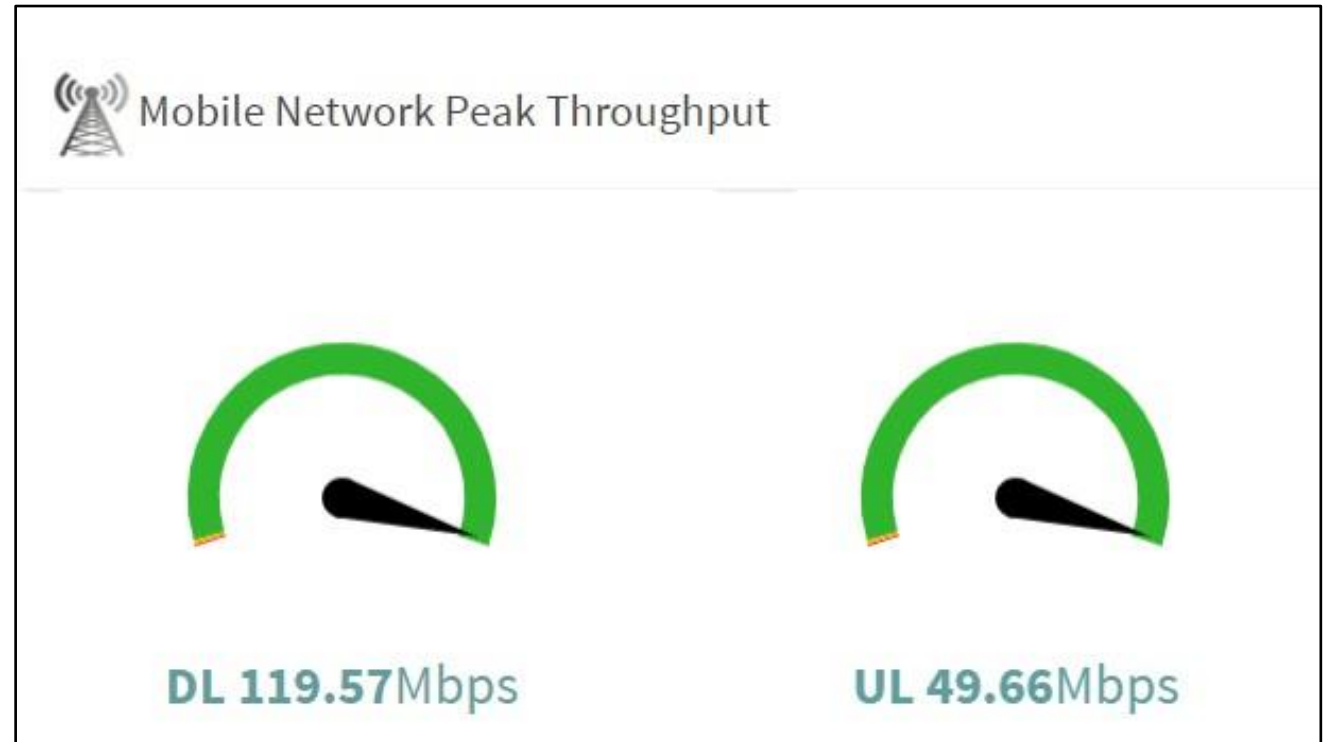
Overall summary for 6 users data

Wi-Fi connection rarely used

Negative Events

Observations:
- When the user is in No data connectivity or Out of reception for more than 5 minutes the user will get alarms
- Users can view the user and Device Info in the alarm event.

Overall summary

Observations:
- LTE 4G coverage needs to be improved as an overall average is at -97dbm for the million samples that were collected.
- In Some locations data connectivity was unavailable this needs to be improved. As those location users will not be able to use their apps.
- Within the measured area we did not notice blind spots that could be reported. More users need to use the RantCell app for a larger footprint on the network.
- Active testing drive test needs to be carried out to check the voice services to identify drop call spots.

Coverage summary for 2G,3G, and 4G based on data collected.

Sum of Average (dBm) and Sum of Total Samples by Network Parameters

● Sum of Average (dBm) ● Sum of Total Samples