

Operator Assisted Drive Test Report

Howrah, Hooghly & Kolkata, West Bengal

April, 2024 (RO, Kolkata)

Key Performance Indicators (KPIs):

The following TSPs could not meet the KPIs benchmark as stated below—

AIRTEL- Handover Success Rate in 2G, Rx Quality in 2G & 4G (SINR) network.

BSNL- Rx Quality in 3G(Ec/Io) & 4G (SINR) network.

RJIO-Rx Quality in 4G (SINR) network.

VIL- Rx Quality in 4G (SINR) network.

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Howrah, Hooghly and Kolkata including National Highway 12, 16 and 19 on 25th and 26th April 2024 from 08.30 AM to 07.30 PM. The drive test covered drive route of 322 KMs (approx) over a period of two days. Approximately 446+ calls were made for each of the 8 networks: three 2G networks, one 3G network and four 4G networks covering four TSPs.

Overview

Voice
Summary

Data
Summary

Overview

Howrah is located on the western bank of the Hooghly River, opposite its twin city of Kolkata. Administratively Howrah lies within Howrah district, and is the headquarters of the Howrah Sadar subdivision.

Hooghly district is one of the districts of the Indian state of West Bengal. The district is named after the Hooghly River. The headquarters of the district are at Hooghly Chinsurah (*Chunchura*).

Kolkata, formerly known as **Calcutta** is the capital and largest city and capital of the Indian state of West Bengal. It lies on the eastern bank of the Hooghly It is the primary financial and commercial centre of eastern and northeastern.

The test results obtained from these drive tests were utilized to assess the network quality for Voice and Data services in terms of:

Voice: Coverage, Quality, Call Setup Success Rate, Drop Call Rate and Block Call Rate.

Data: Download Throughputs and Data File Success Rate.

Voice Tests: Calls were made for 90 secs duration with wait time of 5 secs between call in all technologies. Three 2G networks, one 3G network, Three 4G networks covering 4 unique TSPs were tested.

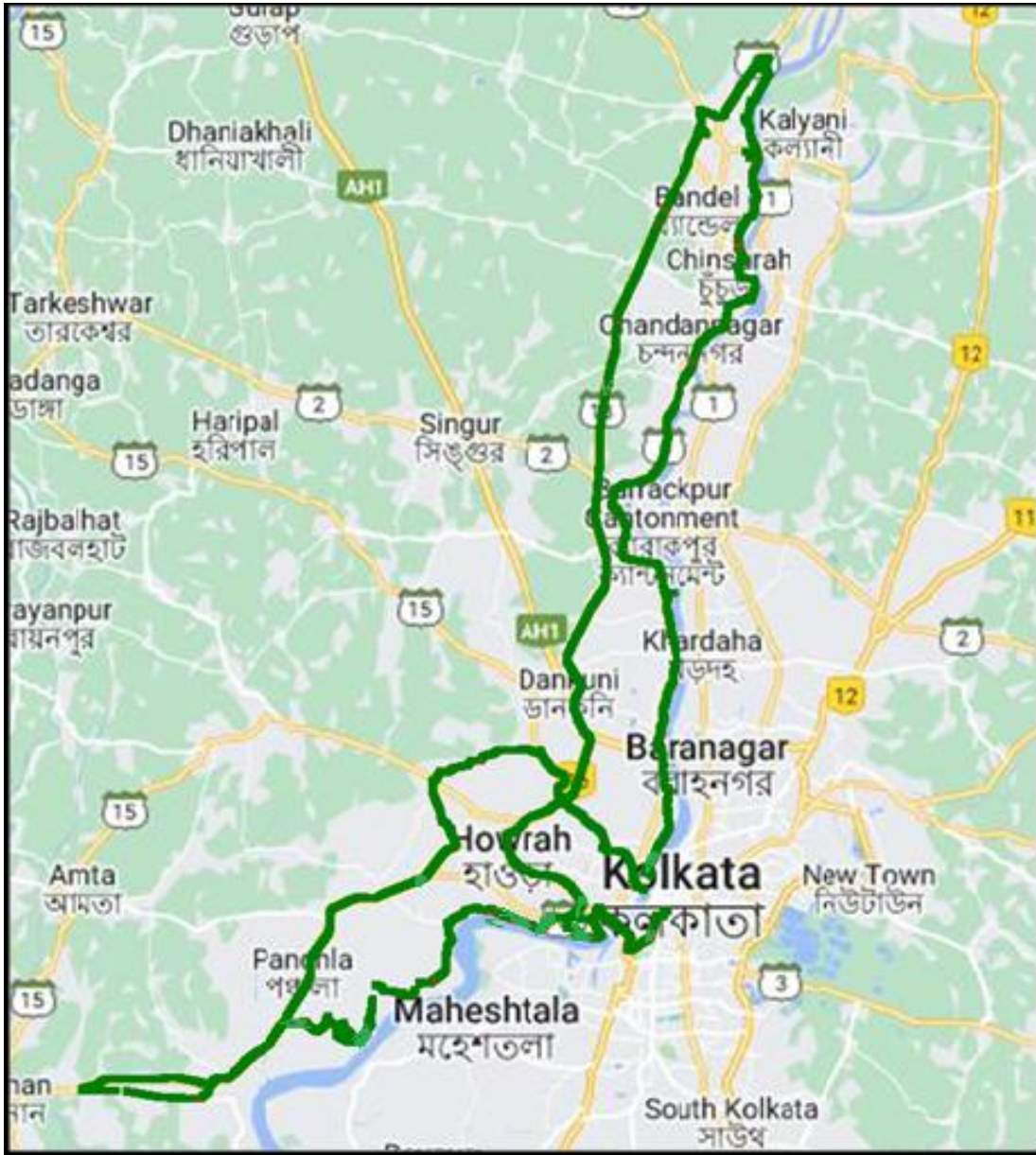
Data Tests: Dynamic Data Service Testing was performed along same route in all technologies. 500 KB file for 2G, 20MB file for 3G and 40MB file for 4G were downloaded from FTTP server in TSP's own server. Static Data Service Testing was also performed. Three 2G (Lock Mode) networks, one 3G (Lock Mode) network, Four LTE (Lock Mode) networks covering 4 unique TSPs were tested.

Service	Static Data Service Testing- Specifications
Download	2G (Locked) - 500KB, 3G (Locked) - 20 MB, 4G (Locked) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Locked) - 5 MB, 4G (Locked) - 10 MB
Web Browsing	3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm
Video Steaming	130 secs Clip
Latency	32 Bytes on www.google.com

Technology/ TSP	AIRTEL	BSNL	RJIO	VODAFONE-IDEA
2G	YES	YES	NO	YES
3G	NO	YES	NO	NO
4G	YES	NO	YES	YES
TOOL USED	TEMS	NIMO	X-CAL	TEMS

Overview

Voice & Dynamic Data Test Drive Route



Drive Routes: Howrah, Hooghly, Kolkata

DAY-1 –Chadni Metro—2nd Hooghly Bridge- B Garden—Chapatala More –Chengail – Nona – Kulgachia – Banibon Bazar Uluberia – Banharishpur-Ranihati – Khantora – Jagadishpur More – Kamrangu Andul – NH 12 Santragachi – CTC Bus Stand Chandmari – Gharaj Soni Mandir – IEST Shibpur – Mandirtala – Ramrajatala – Belilious Road Kadamtala –2nd Hooghly Bridge– Esplanade Bus Stand **DAY – 2** –Howrah Railway Museum – Howrah Railway Station– Chatterjee Para More – Eksara– Dankuni - Hoogly – Delhi Road – Mogra BDO Office in Chinsurah – Kuntighat Railway Station – Tribeni Fire Station - Vidya Vihar School – Dunlop Ferry Ghat - Hooghly Mohsin College - Jora Ghat Chandannagar – Babu Ghat Bhadreswar - Mahesh Jagannath Ghat – Raja Peary Mohan College Uttarpara –Bandhaghat Launch Ghat – Howrah Bus Stand—East West Metro (Howrah Station to Esplanade).

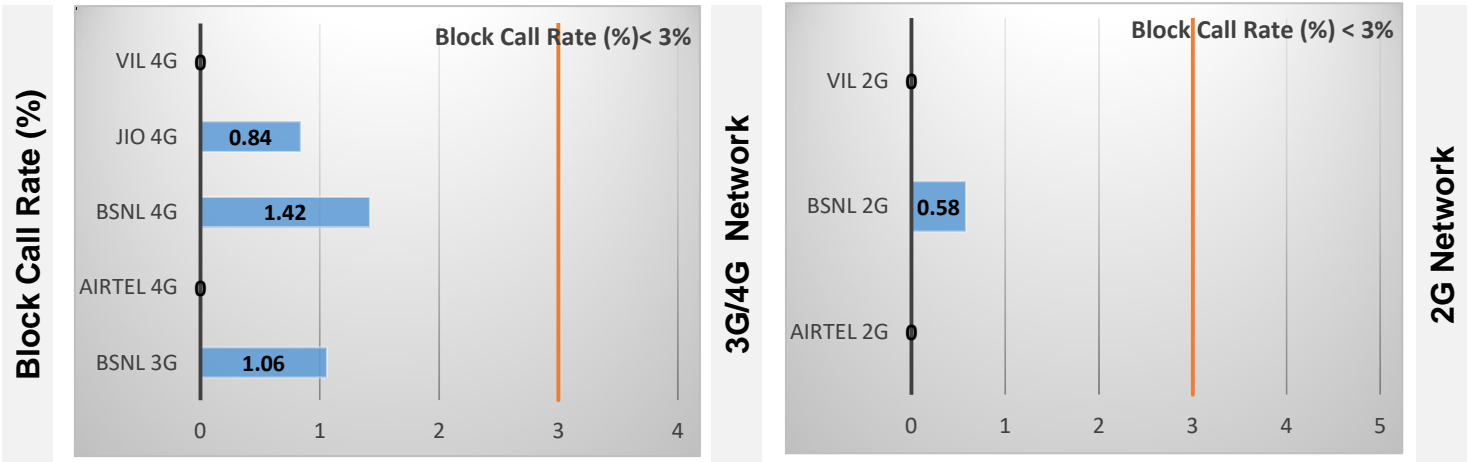
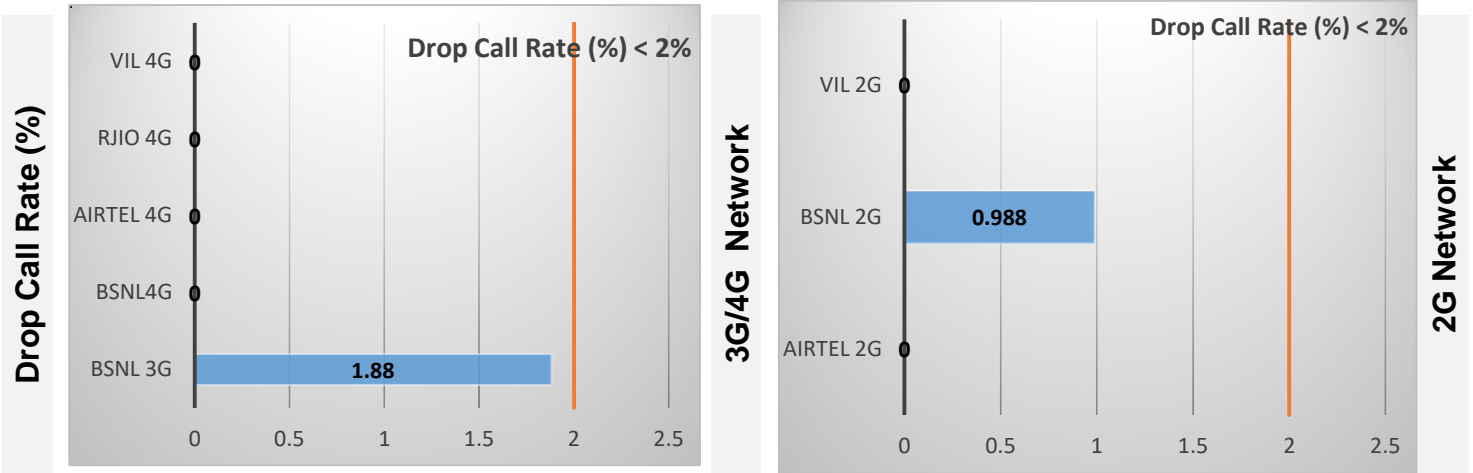
Data Service Test- Static Locations

Static Locations
ESPLANADE (NBSTC Bus stand)
BE COLLEGE (3rd Gate)

Voice Calls

Key Observations

QoS compliance of the TSPs for Voice across technologies 2G/3G/4G-VoLTE:



KPIs	2G			3G	4G-VoLTE			
	AIRTEL	BSNL	VIL	BSNL	AIRTEL	RJIO	VIL	BSNL
Drop Call Rate %	0.0	0.98	0.0	1.88	0.00	0.0	0.0	0.0
Block Call Rate %	0.0	0.58	0.0	1.06	0.0	0.84	0.0	1.42

- a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%).
- b) All TSPs have met the 3% QOS benchmark of Block Call Rate (BCR%).

Coverage

a) Percentage of coverage samples for 2G \geq -85 dBm.

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	96.36	86.34	92.69

b) Percentage of coverage samples for 3G \geq -90 dBm & 4G \geq -110 dBm.

TSPs	3G	4G			
	BSNL	AIRTEL	RJIO	VIL	BSNL
Coverage	67.08	98.44	99.46	97.84	80.07

Summary

City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	322	509	647
Blocked Call Rate (%)	0.0	0.58	0.0
CSSR% (Accessibility)	100	99.41	100
Drop Call Rate (%)	0.0	0.98	0.0
Mobility HOSR (%)	92.62	99.17	98.89
Rx Quality (%)	94.66	97.19	95.18

Voice Call	3G/4G				
	BSNL 3G	AIRTEL 4G	BSNL 4G	RJIO 4G	VIL 4G
Call Attempt	376	341	70	479	454
Blocked Call Rate (%)	1.06	0.0	1.42	0.84	0.0
CSSR% (Accessibility)	98.94	100	98.57	99.16	100
Drop Call Rate (%)	1.88	0.0	0.0	0.0	0.0
Mobility HOSR (%)	100	99.56	100	99.45	99.94
Rx Quality (%)	86.29	91.56	84.68	91.88	85.74

Summary-Data Services Dynamic

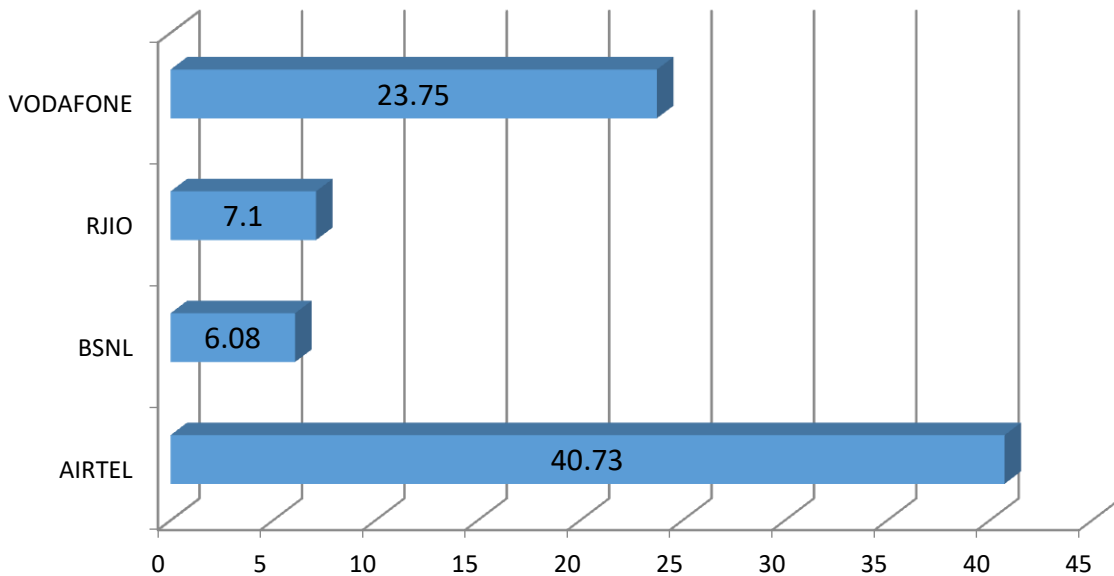
Key Observations

Dynamic Data was tested for 322 Kms. Download Throughput was tested.

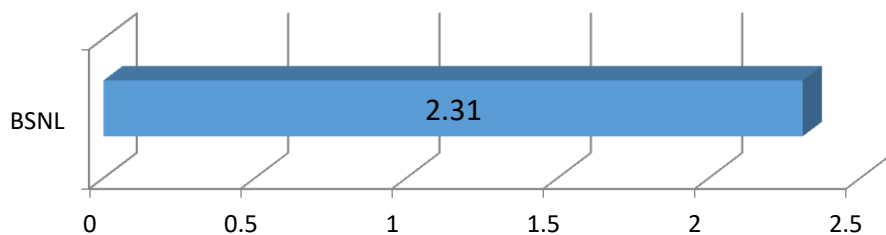
Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing

4G/3G Network:

4G-Dynamic Download Throuhput (Mbps)



3G-Dynamic Download Throuhput (Mbps)



Summary-Data Services Static

City Level Summary-

Average Data Services Static	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	6.97	128	94.99
Upload Throughput (kbps)	4.37	60.5	48.6
Web Browsing Delay (sec)	0.0	73.63	3.12
Latency (msec)	0.0	204.5	216.0

Average Data Services Static	3G/ 4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	2.15	10.45	4.96	3.4
Upload Throughput in Mbps	1.29	4.30	3.51	2.39
Video streaming delay (sec)	5.8	0.0	1.33	1.08
Web Browsing Delay (secs)	16.31	0.0	2.54	0.19
Latency (msec)	97.25	60.0	42.92	93.0

Summary-Data Services Static

Location Level Summary-

Location:-B.E. College Gate III	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	7.15	160.0	94.99
Upload Throughput (kbps)	4.68	59.0	48.6
Web Browsing Delay (sec)	failed	73.96	3.12
Latency (msec)	failed	193	216

Location:-B.E. College Gate III	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	1.87	15.51	3.39	3.18
Upload Throughput in Mbps	1.17	8.14	1.22	2.25
Video streaming delay (secs)	6.0	0.0	1.5	1.02
Web Browsing Delay (secs)	14.35	0.0	2.74	0.18
Latency (msec)	105.5	71.0	36.5	92

Location:- Esplanade Bus Stand	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	6.78	96.0	96.41
Upload Throughput in (kbps)	4.05	62.0	79.17
Web Browsing Delay (secs)	failed	73.3	3.92
Latency (msec)	failed	216	214

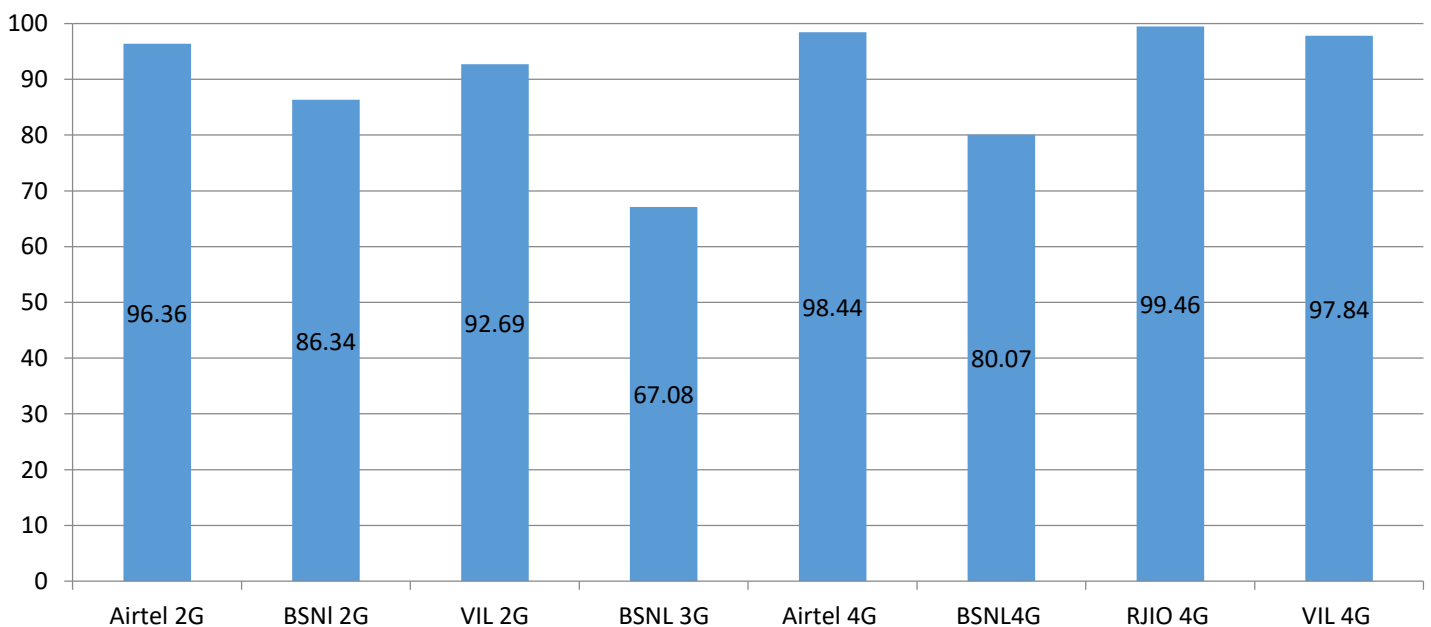
Location:- Esplanade Bus Stand	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	2.44	5.38	6.52	3.62
Upload Throughput in (mbps)	1.41	0.45	5.80	2.53
Video streaming delay (secs)	5.6	failed	1.16	1.13
Web Browsing Delay (secs)	18.28	0.0	2.34	0.2
Latency (msec)	89	49	49.34	94

I. Coverage Details

RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call session. The Coverage rate is calculated on the basis of % of samples in which the Rx level ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110 dBm. The details are as follows.

TSP	Coverage Rate %
AIRTEL 2G	96.36
BSNL 2G	86.34
VIL 2G	92.69
BSNL 3G	67.08
AIRTEL 4G	98.44
RJIO 4G	99.46
VIL 4G	97.84
BSNL 4G	80.07

Coverage Rate %



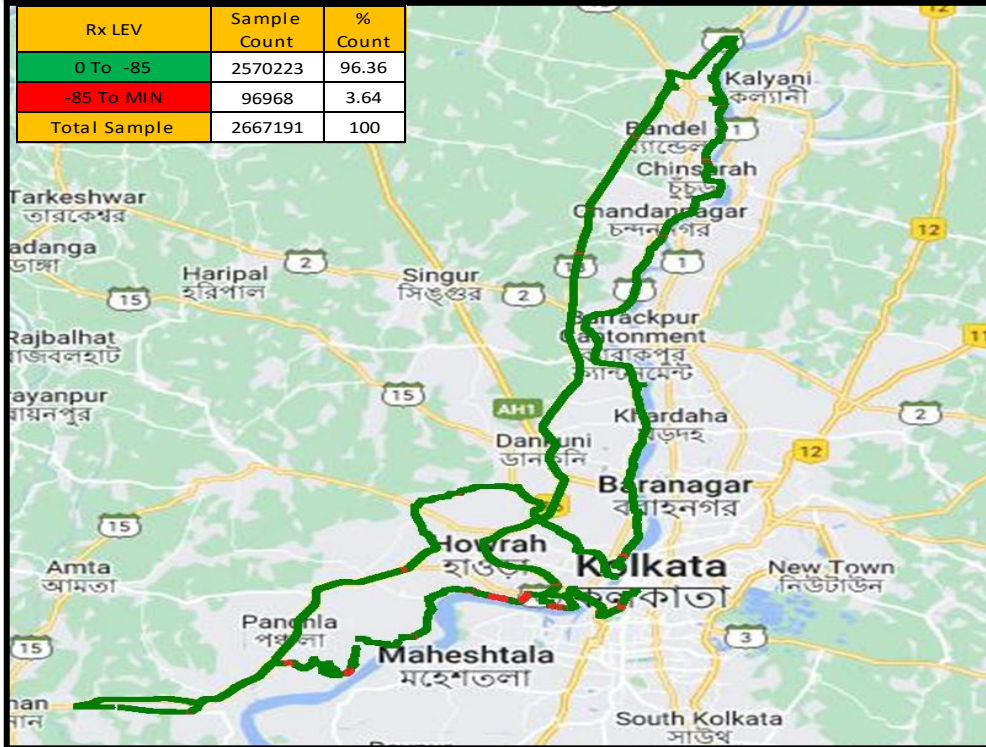
Note- Coverage is the percentage of samples having signal strength more than the threshold value (2G ≥ -85 dbm, 3G ≥ -90 dbm and 4G ≥ -110 dbm). However, these samples are only for the portion of the OADT routes where TSPs have coverage i.e 'no coverage' routes have been excluded.

I. Coverage Details

AIRTEL

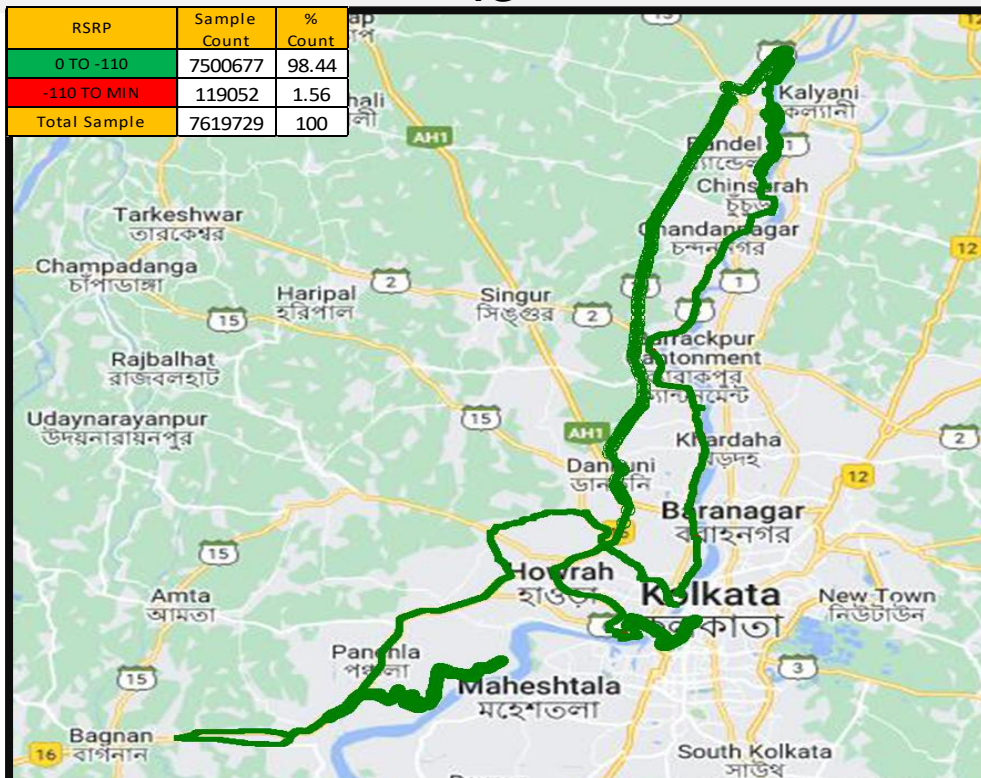
Technology	Coverage Rate %
2G	96.36
4G	98.44

2G



Overall Rx Level	Sample %
[Max >=-75]	78.80
[-75 >=-85)	17.57
[-85 >=-95)	3.40
[-95 >=Min)	0.23
Total	100

4G



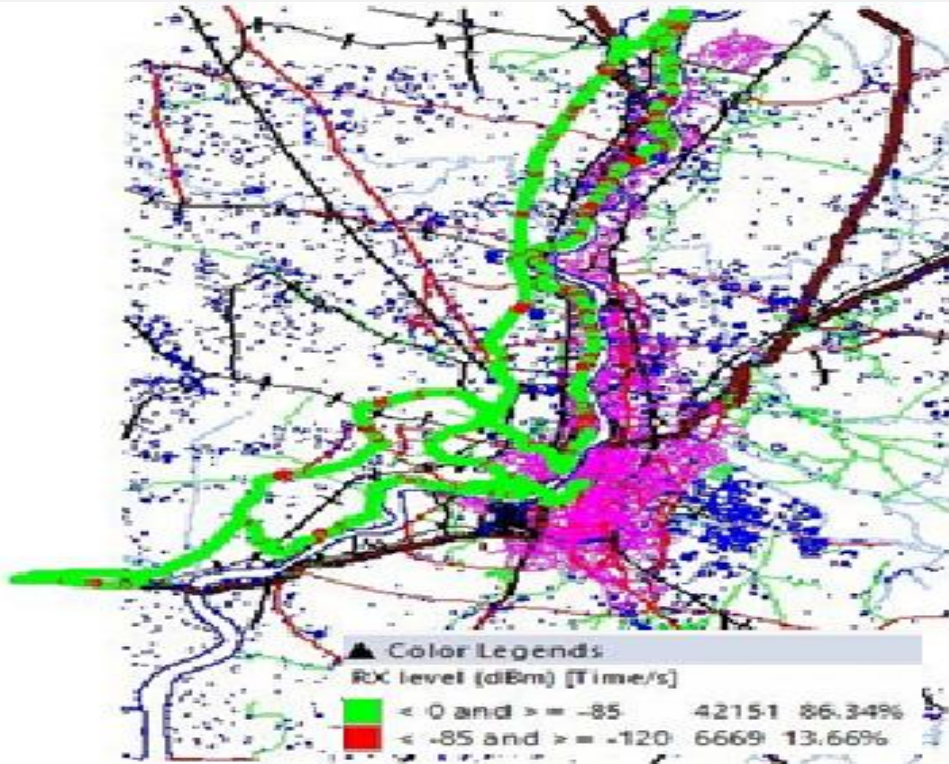
Overall RSRP	Sample %
[Max >=-80]	20.15
[-80 >=-90)	46.53
[-90 >=-110)	31.76
[-110 >=Min)	1.56
Total	100.00

I. Coverage Details

BSNL

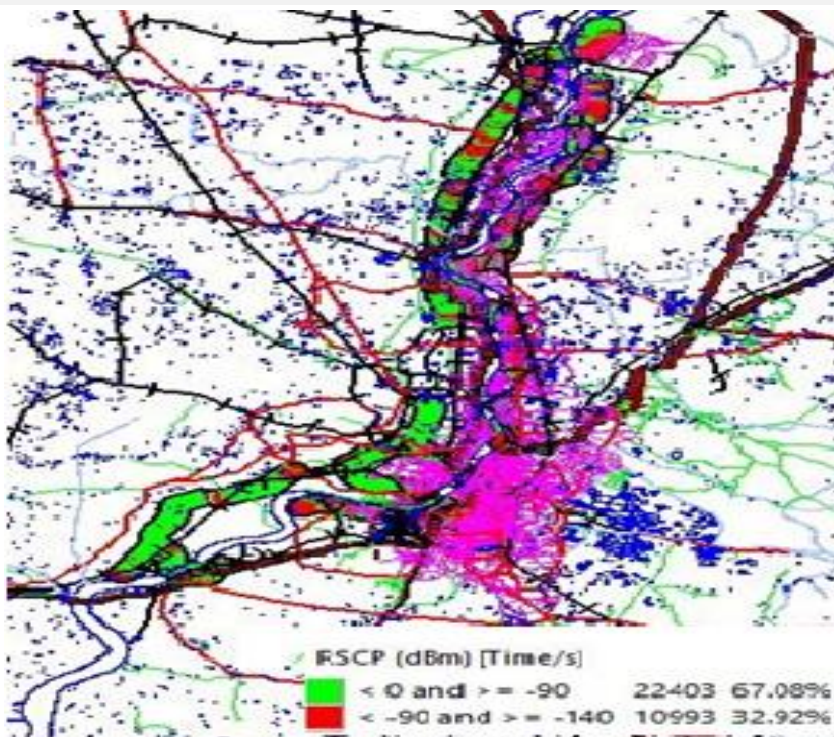
Technology	Coverage Rate %
2G	86.34
3G	67.08

2G



Overall RxLevel	Sample %
[Max >= -75]	57.23
[-75 >= -85]	29.11
[-85 >= -95]	12.31
[-95 >= Min]	1.35
Total	100

3G

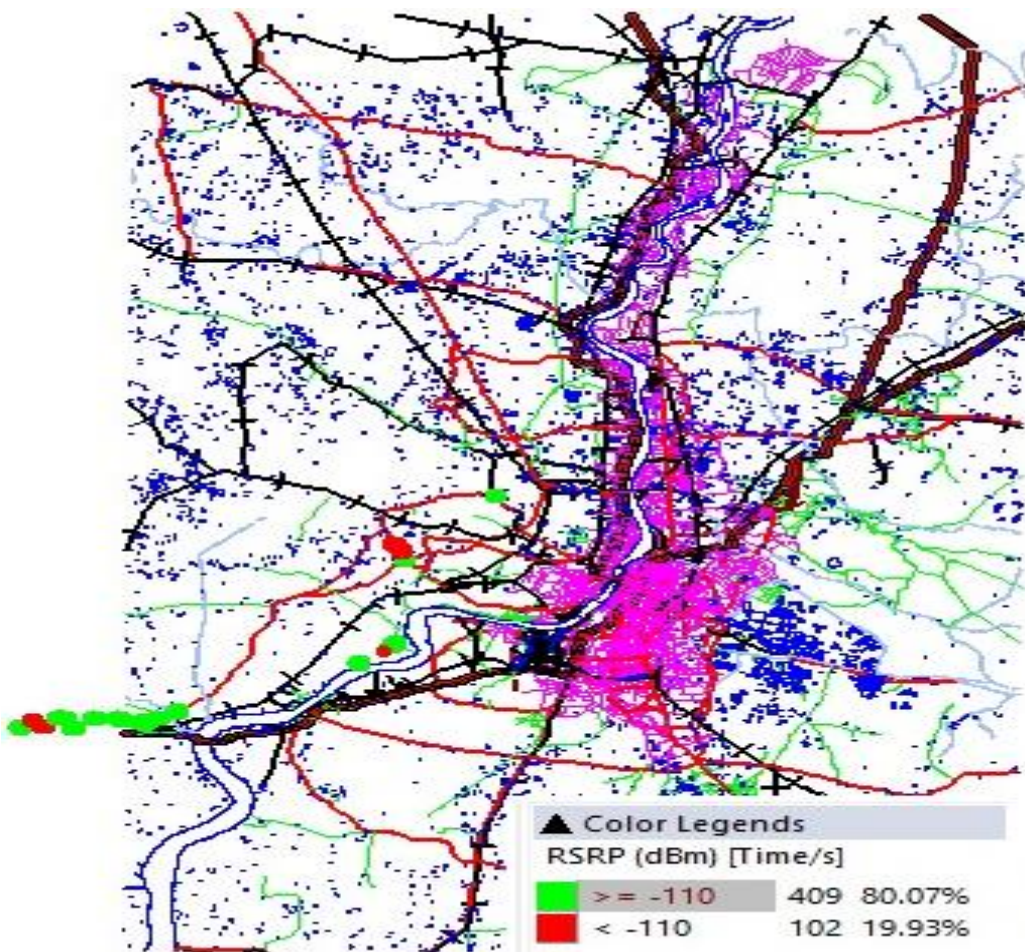


Overall RSCP	Sample %
[Max >= -70]	18.04
[-70 >= -80]	22.58
[-80 >= -90]	26.47
[-90 >= Min]	32.91
Total	100

I. Coverage Details

BSNL

Technology	Coverage Rate %
4G	80.07
4G	

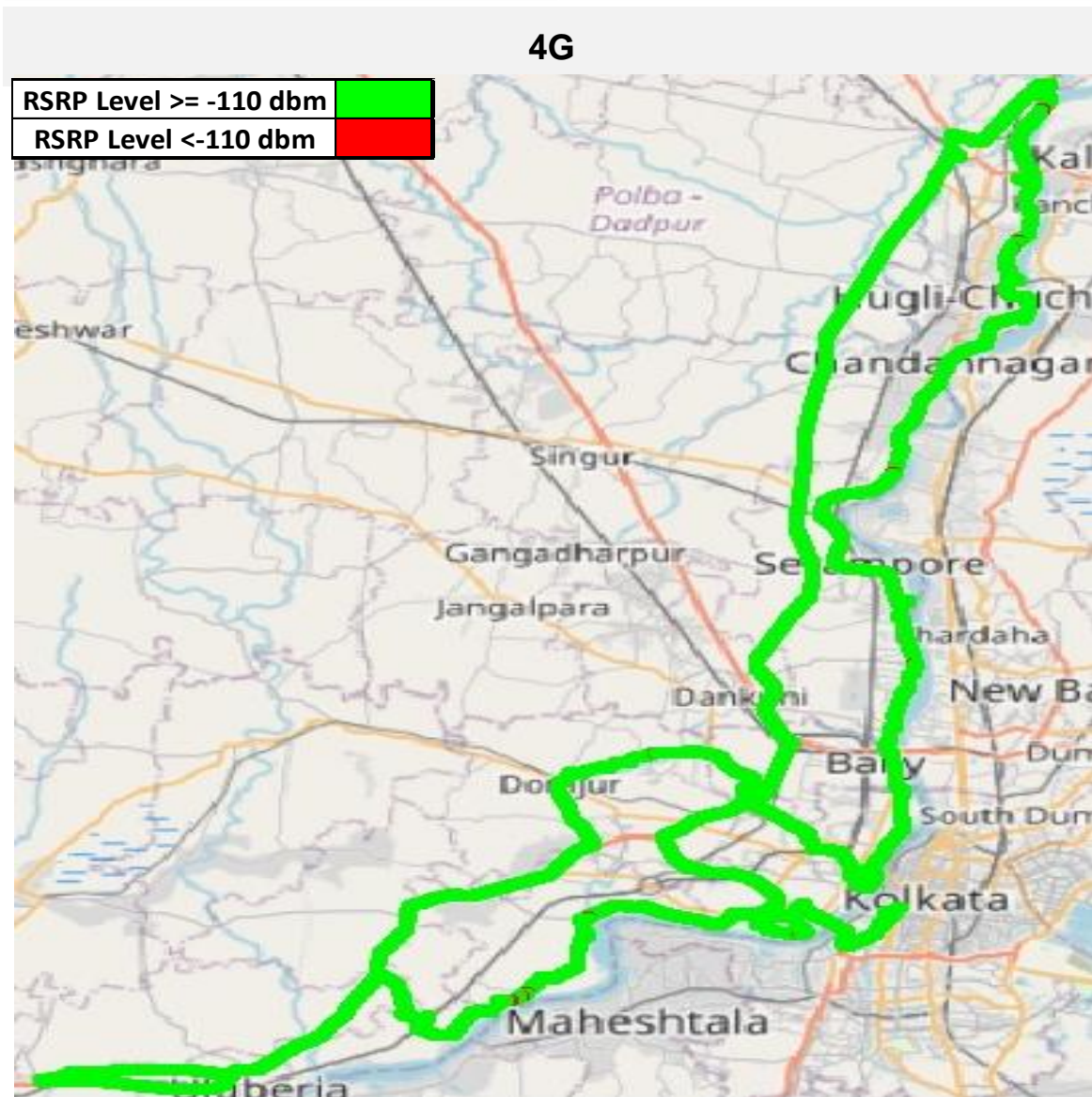


Overall RSRP	Sample %
[Max >=-80]	11.78
[-80 >=-90)	18
[-90 >=-110)	50.29
[-110 >=Min)	19.93
Total	100

I. Coverage Details

RJIO

Technology	Coverage Rate %
4G	99.46



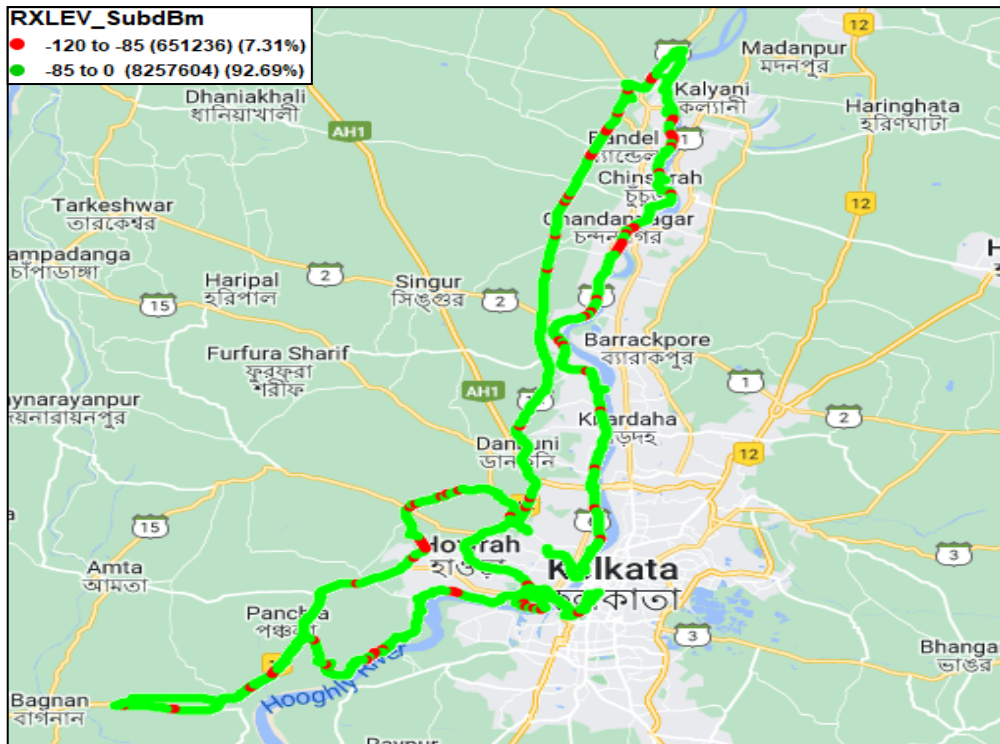
Overall RSRP	Sample %
[Max \geq -80]	55.45
[-80 \geq -90)	25.98
[-90 \geq -110)	18.17
[-110 \geq Min)	0.41
Total	100

I. Coverage Details

VIL

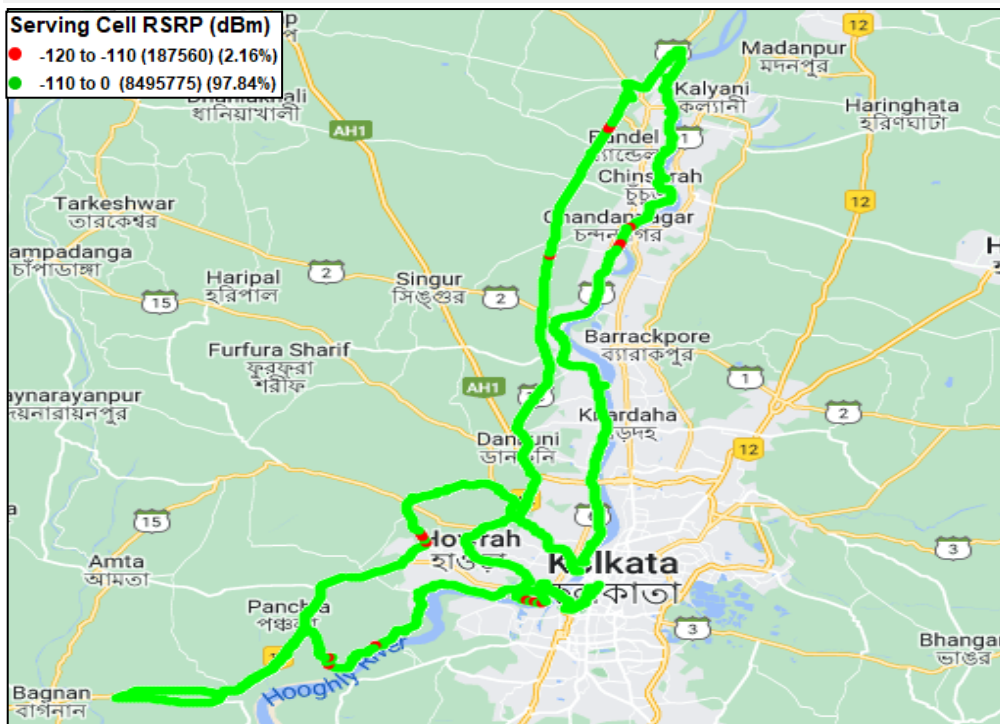
Technology	Coverage Rate %
2G	92.69
4G	97.84

2G



Overall RxLevel	Sample %
[Max >=-75]	54.24
[-75 >=-85]	38.45
[-85 >=-95]	6.96
[-95 =Min)	0.35
Total	100

4G

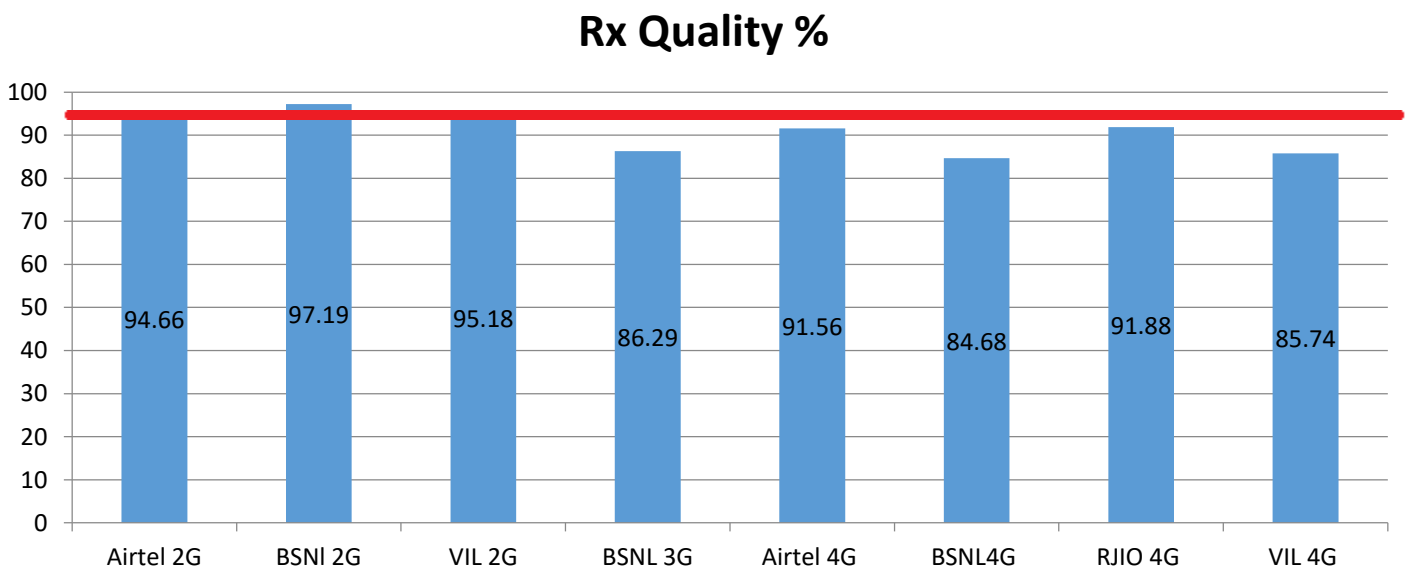


Overall RSRP	Sample %
[Max >=-80]	13.92
[-80 >=-90]	32.31
[-90 >=-110]	51.61
[-110 >=Min)	2.16
Total	100

II. Quality Details

For measuring voice quality, as per the QoS norms, Rx Quality \leq 5 for GSM, Ec/No \geq -14 dBm for 3G and SINR $>$ 0 in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually be \geq 95%.

TSP	Rx Quality %
AIRTEL 2G	94.66
BSNL 2G	97.19
VIL 2G	95.18
BSNL 3G	86.29
AIRTEL 4G	91.56
RJIO 4G	91.88
VIL 4G	85.74
BSNL 4G	84.68

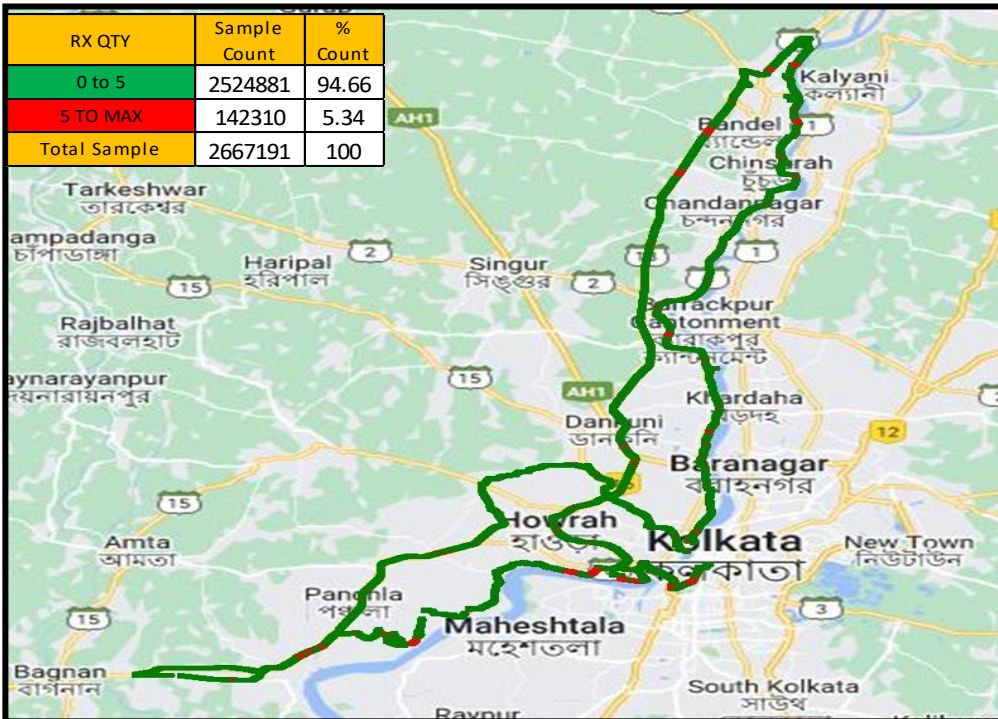


II. Quality Details

AIRTEL

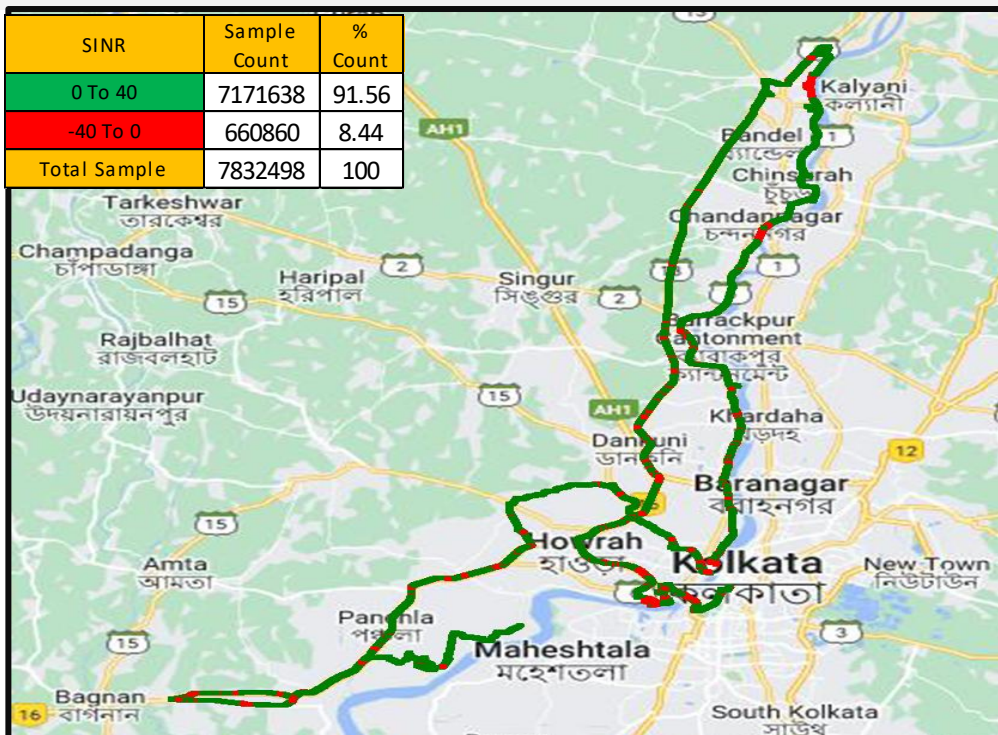
Technology	Rx Quality %
2G	94.66
4G	91.56

2G



Overall Rx Quality	Sample %
(Min <=2)	89.52
(2 <=3)	1.66
(3 <=4)	1.74
(4 <=5)	1.74
(5 <=Max)	5.34
Total	100

4G



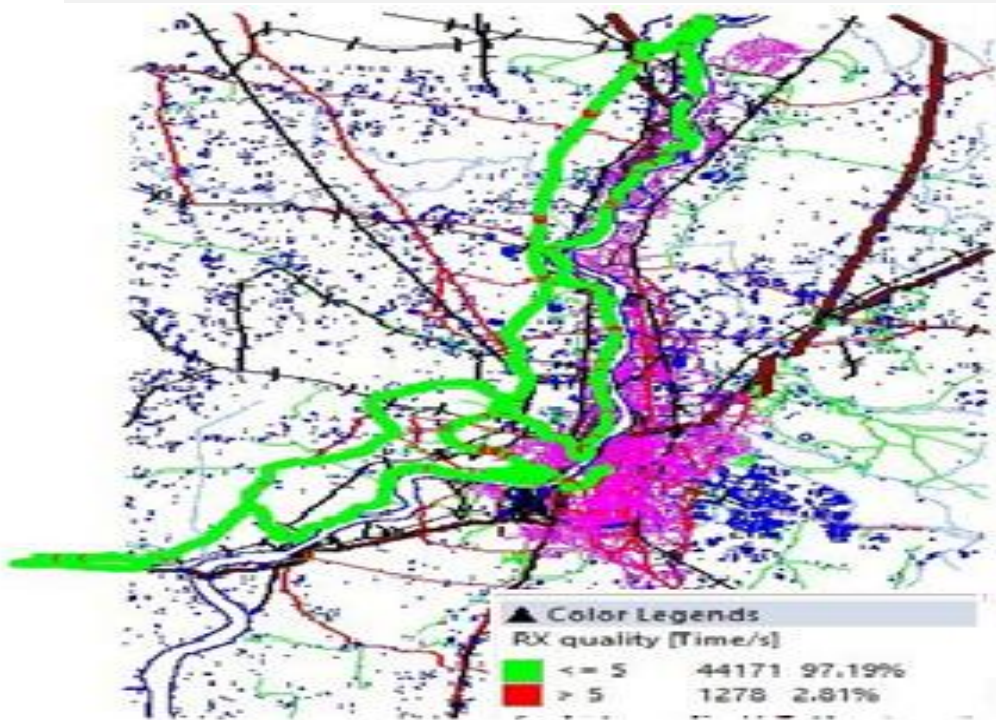
Overall SINR	Sample %
(Min <=0)	8.44
(0 <=5)	66.07
(5 <=10)	10.68
(10 <=15)	7.92
(15 <=Max)	6.89
Total	100

II. Quality Details

BSNL

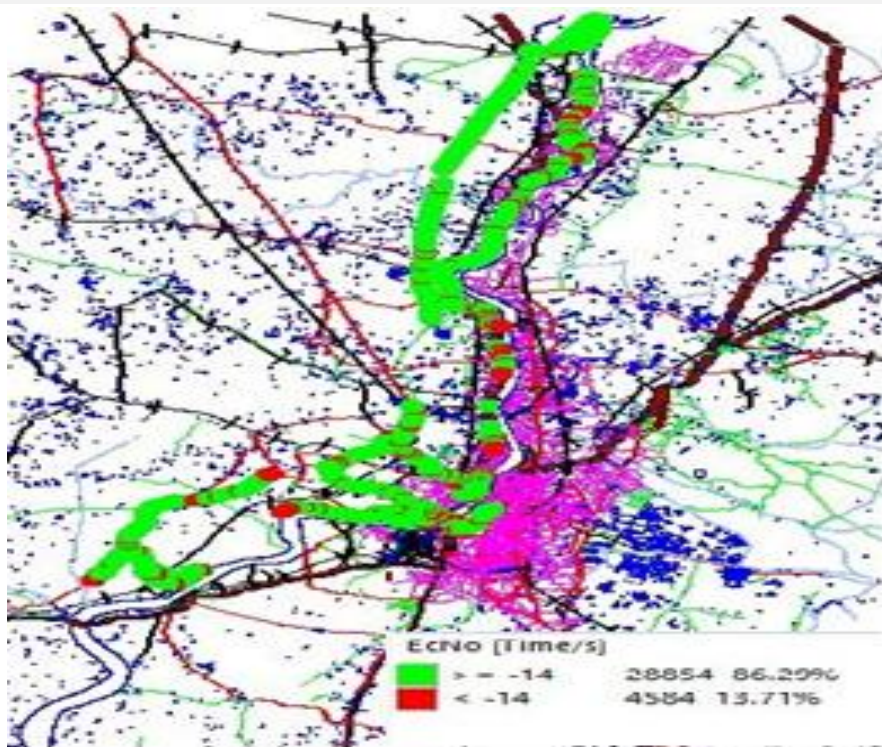
Technology	Rx Quality %
2G	97.19
3G	86.29

2G



Overall Rx Quality	Sample %
(Min ≤=2)	92.72
(2 ≤=3)	1.56
(3 ≤=4)	1.68
(4 ≤=5)	1.23
(5 ≤=Max)	2.81
Total	100

3G



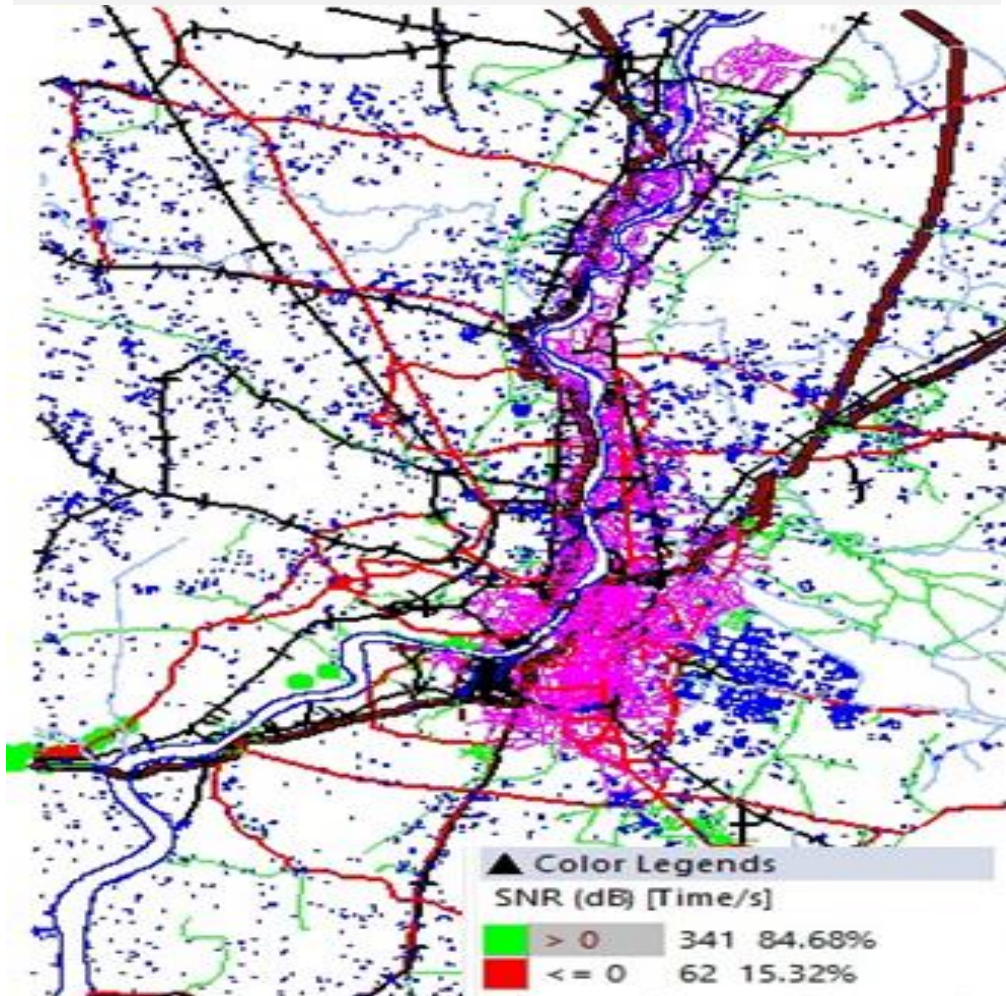
Overall EcNo	Sample %
(Max ≤=-6)	7.92
(-6 ≤=-9)	18.23
(-9 ≤=-11)	26.03
(-11 ≤=-14)	34.11
(-14 ≤= Min)	13.71
Total	100

II. Quality Details

BSNL

Technology	Rx Quality %
4G	84.68

4G



Overall SINR	Sample %
(Min <=0)	15.32
(0 <=5)	15.55
(5 <=10)	14.87
(10 <=15)	23.72
(15 <=Max)	30.55
Total	100

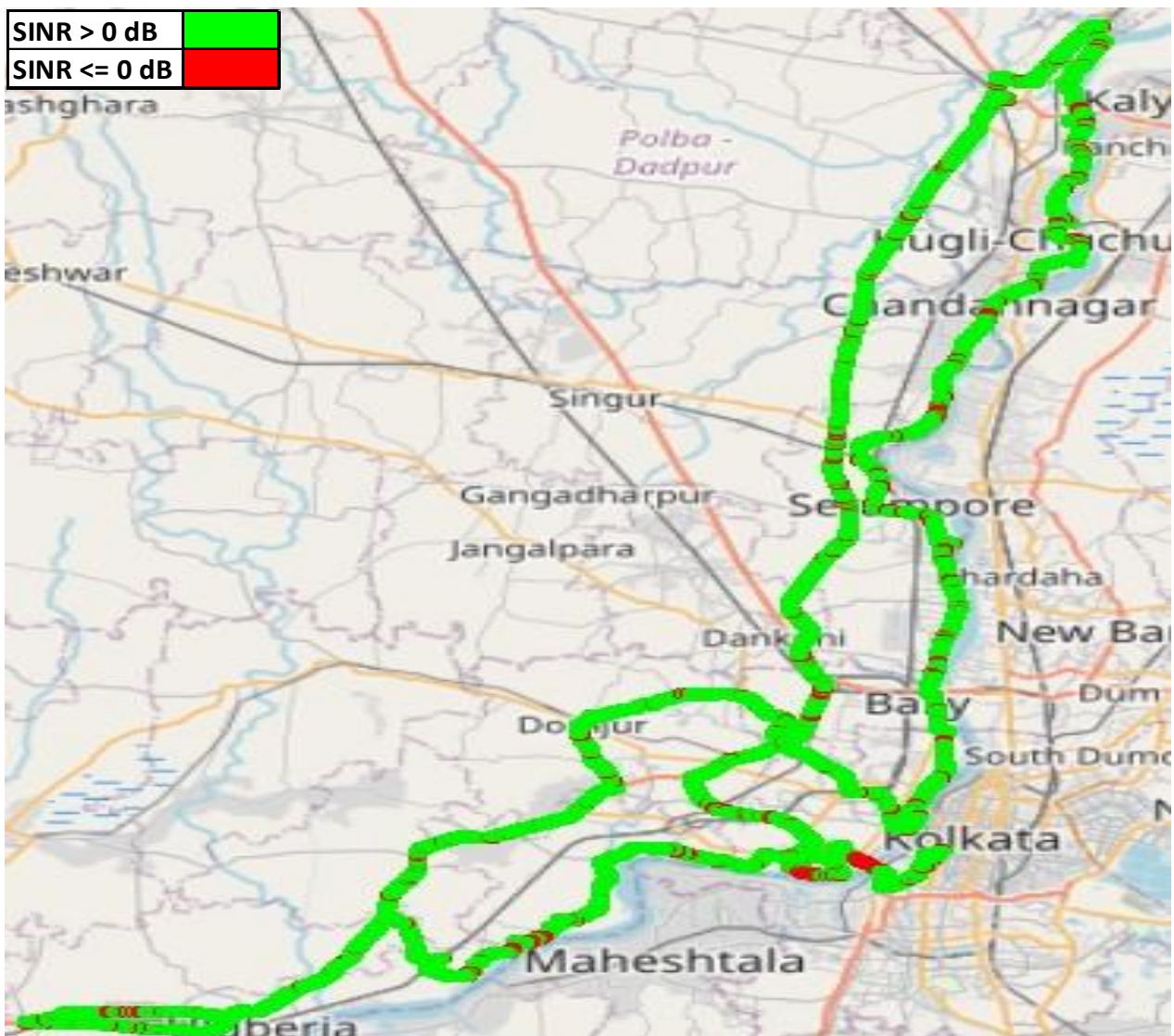
II. Quality Details

RJIO

Technology	Rx Quality %
4G	91.88

4G

SINR > 0 dB	■
SINR ≤ 0 dB	■



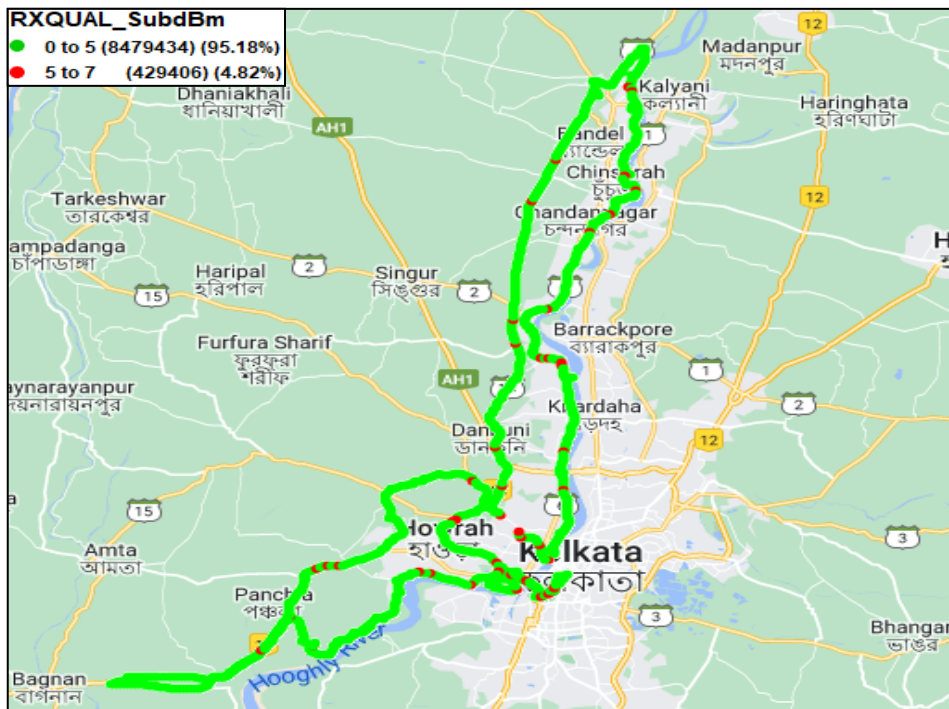
Overall SINR	Sample %
(Min ≤ 0)	8.12
(0 ≤ 5)	20.21
(5 ≤ 10)	25.03
(10 ≤ 15)	22.23
(15 ≤ Max)	24.41
Total	100

II. Quality Details

VIL

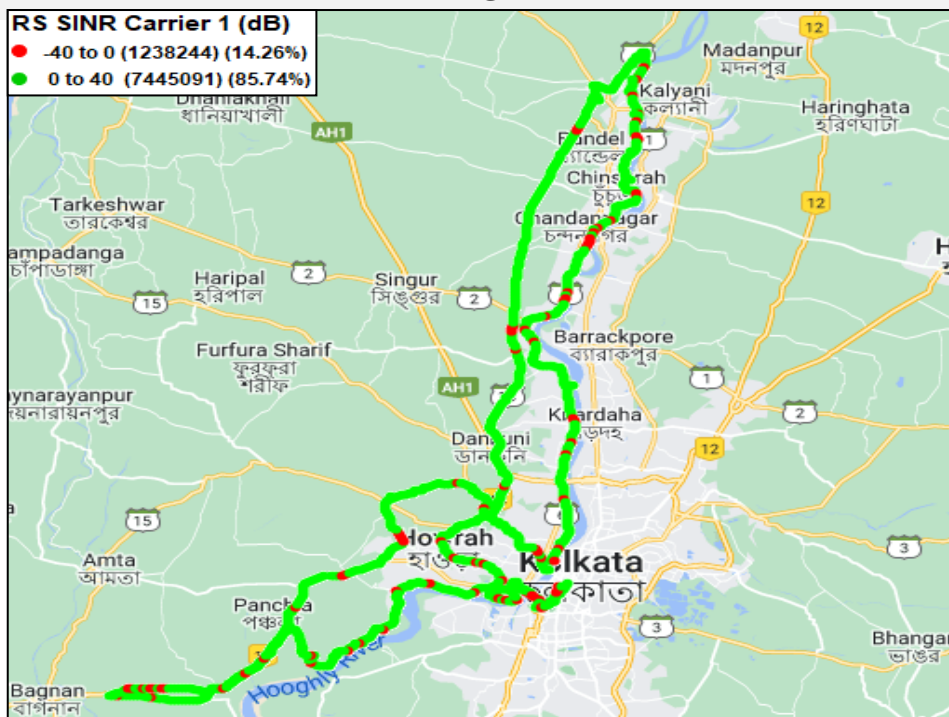
Technology	Rx Quality %
2G	95.18
4G	85.74

2G



Overall Rx Quality	Sample %
(Min <=2)	67.12
(2 <=3)	11.34
(3 <=4)	7.62
(4 <=5)	9.10
(5 <=Max)	4.82
Total	100

4G



Overall SINR	Sample %
(Min <=0)	14.26
(0 <=5)	21.51
(5 <=10)	24.64
(10 <=15)	19.77
(15 <=Max)	19.82
Total	100

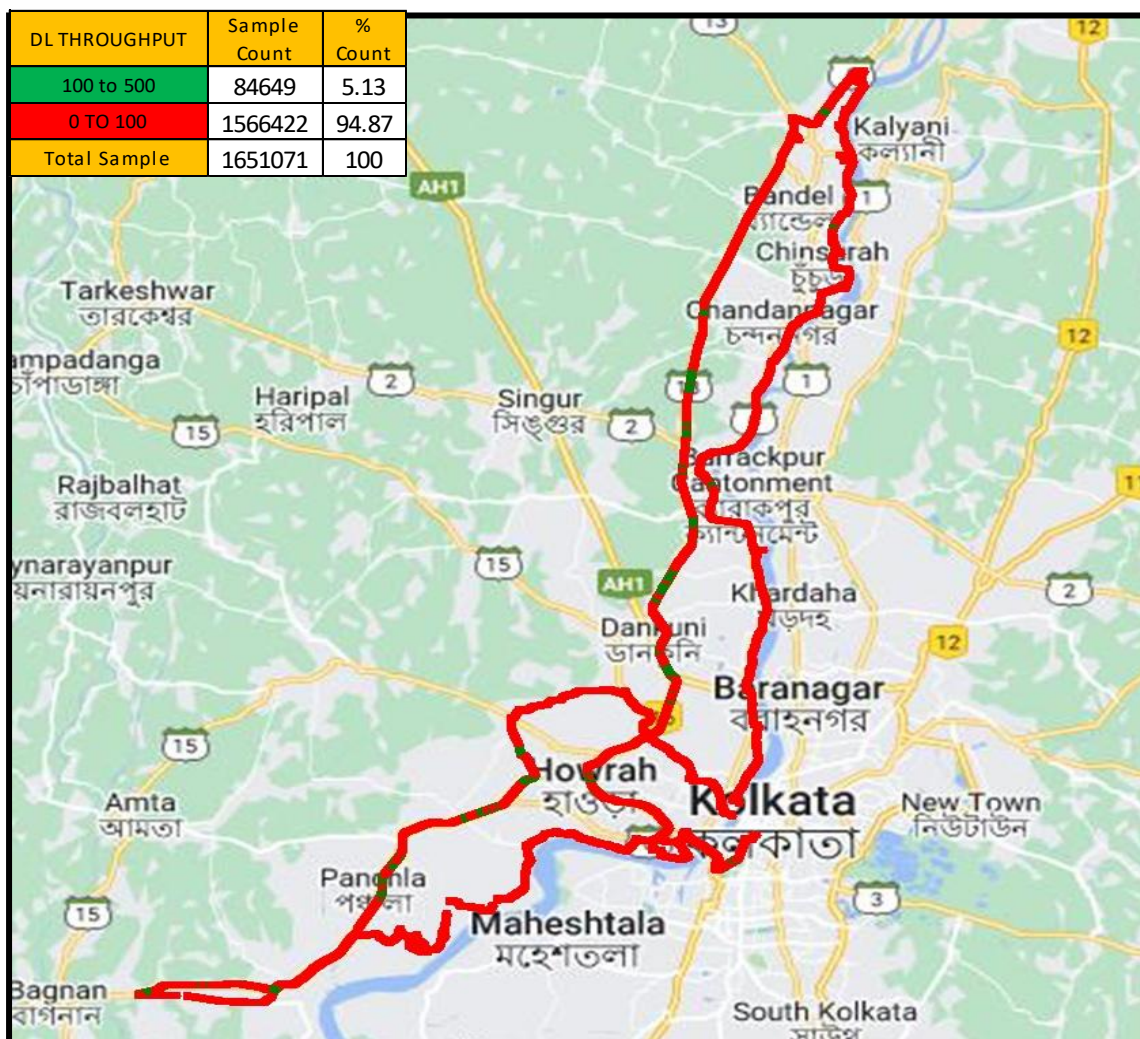
IV. Dynamic Data Test- 2G DL Details

AIRTEL

Dynamic Data Testing Complete 322 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	23.47

2G



AVG. DOWNLOAD SPEED (Kbps)	23.47
% FILE TRANSFER COMPLETE	97.89
DL throughput	Sample %
0 to 50 Kbps	91.47
50 to 100 Kbps	3.40
100 to 200 Kbps	3.93
200 to 300 Kbps	1.16
>300 Kbps	0.03
Total	100

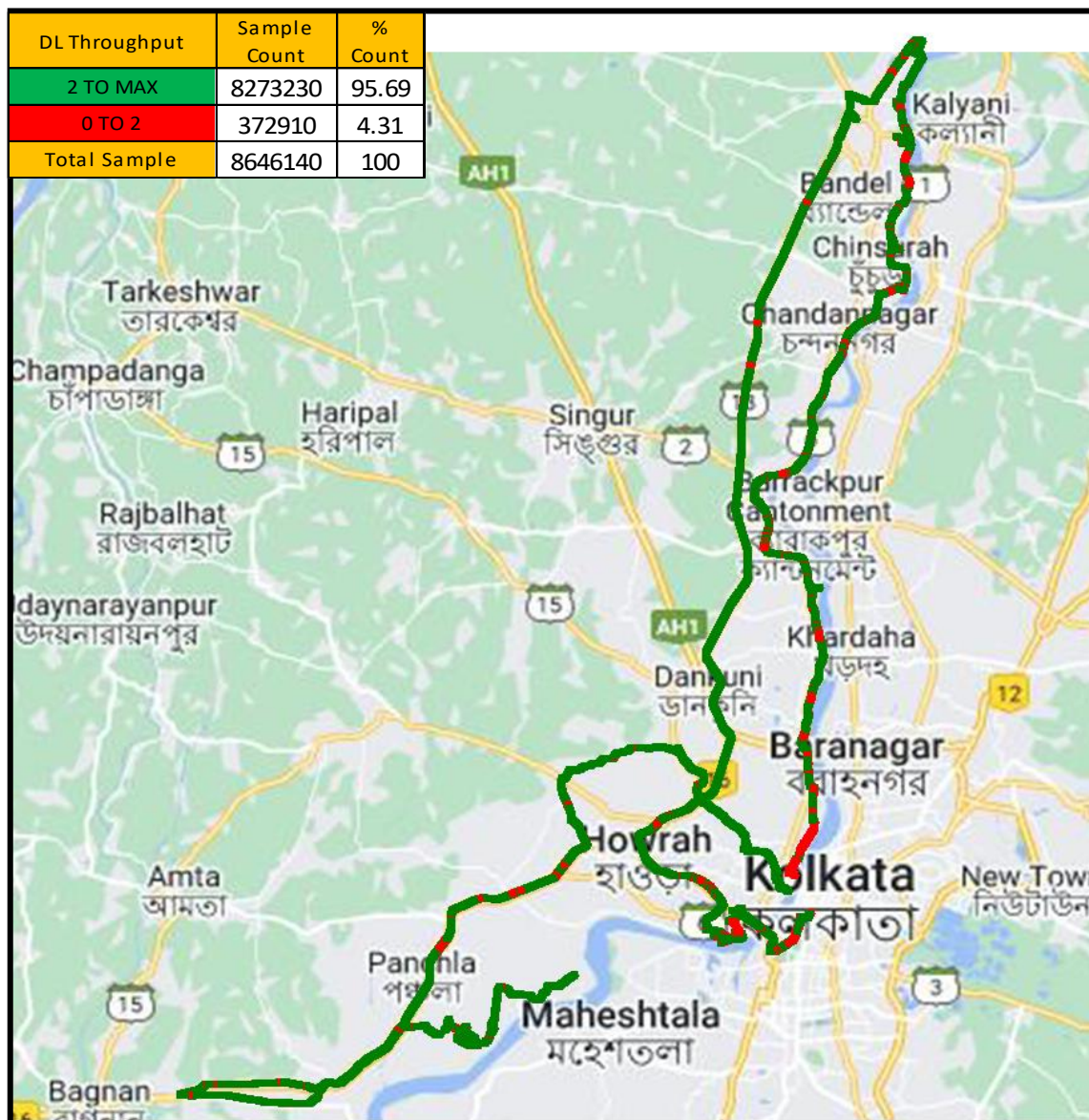
IV. Dynamic Data Test- 4G DL Details

AIRTEL

Dynamic Data Testing Complete 322 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	40.73

4G



AVG. DOWNLOAD SPEED (Mbps)	40.73
% FILE TRANSFER COMPLETE	98.86
DL throughput	Sample %
0 to 1 Mbps	2.82
1 to 2 Mbps	1.49
2 to 5 Mbps	6.72
5 to 10 Mbps	9.06
>10 Mbps	79.91
Total	100

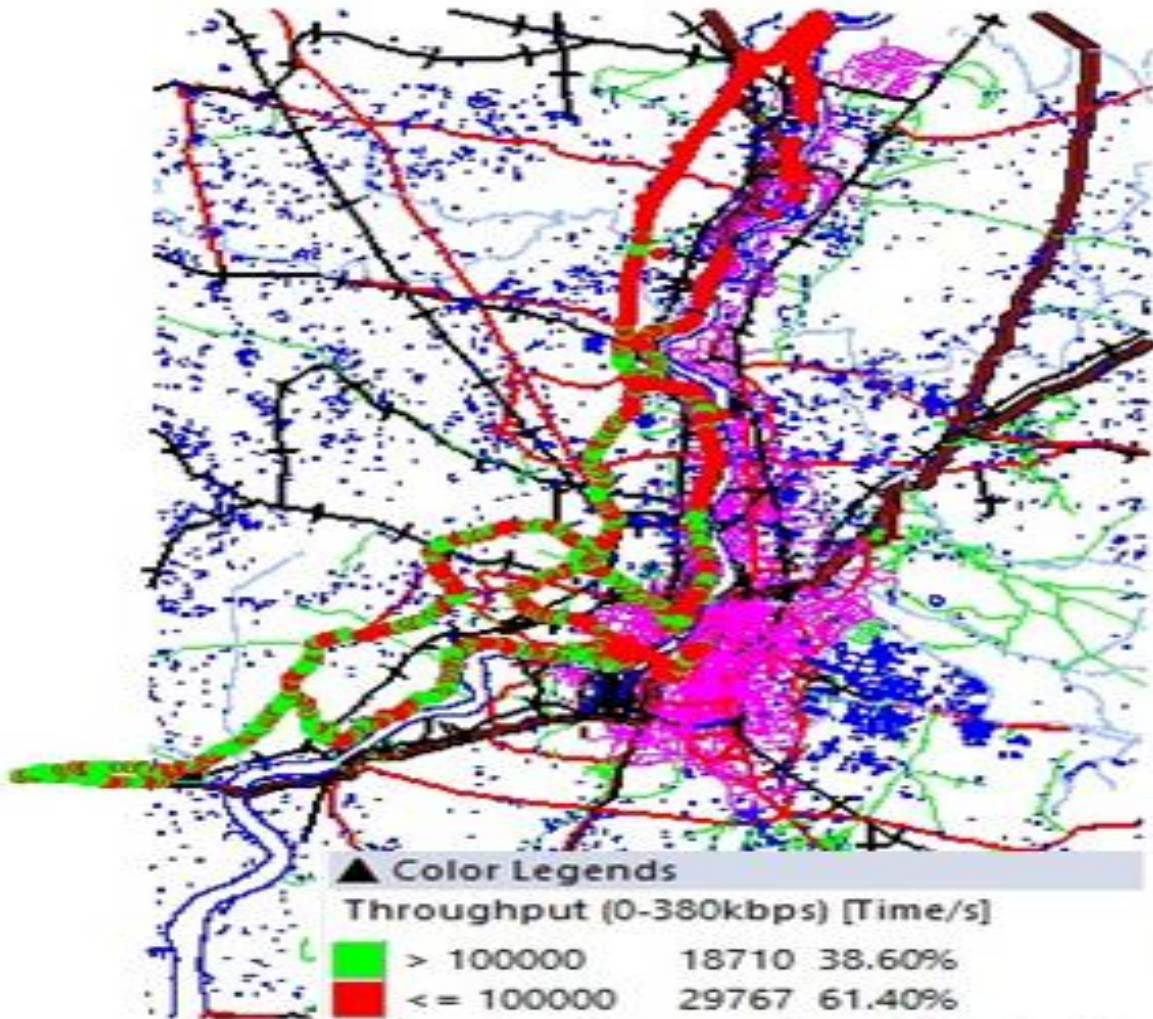
IV. Dynamic Data Test- 2G DL Details

BSNL

Dynamic Data Testing Complete 322 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	98.07

2G



AVG. DOWNLOAD SPEED (Kbps)	98.07
% FILE TRANSFER COMPLETE	97.44
DL throughput	Sample %
0 to 50 Kbps	34.47
50 to 100 Kbps	21.12
100 to 200 Kbps	30.19
200 to 300 Kbps	14.2
>300 Kbps	0.01
Total	100

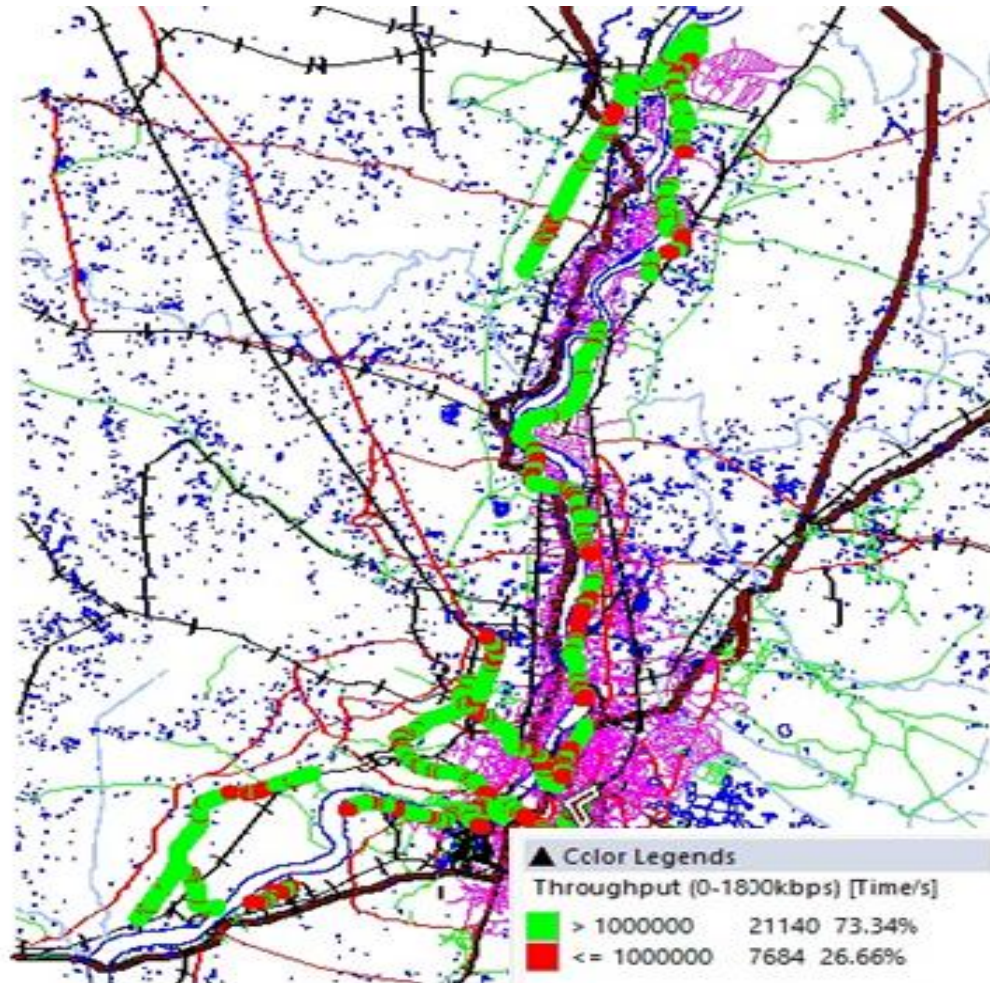
IV. Dynamic Data Test- 3G DL Details

BSNL

Dynamic Data Testing Complete 322 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	2.314

3G



AVG. DOWNLOAD SPEED (Mbps)	2.314
% FILE TRANSFER COMPLETE	98.09
DL throughput	Sample %
0 to 0.5 Mbps	15.63
0.5 to 1 Mbps	11.03
1 to 2 Mbps	16.65
2 to 5 Mbps	34.01
>5 Mbps	22.69
Total	100

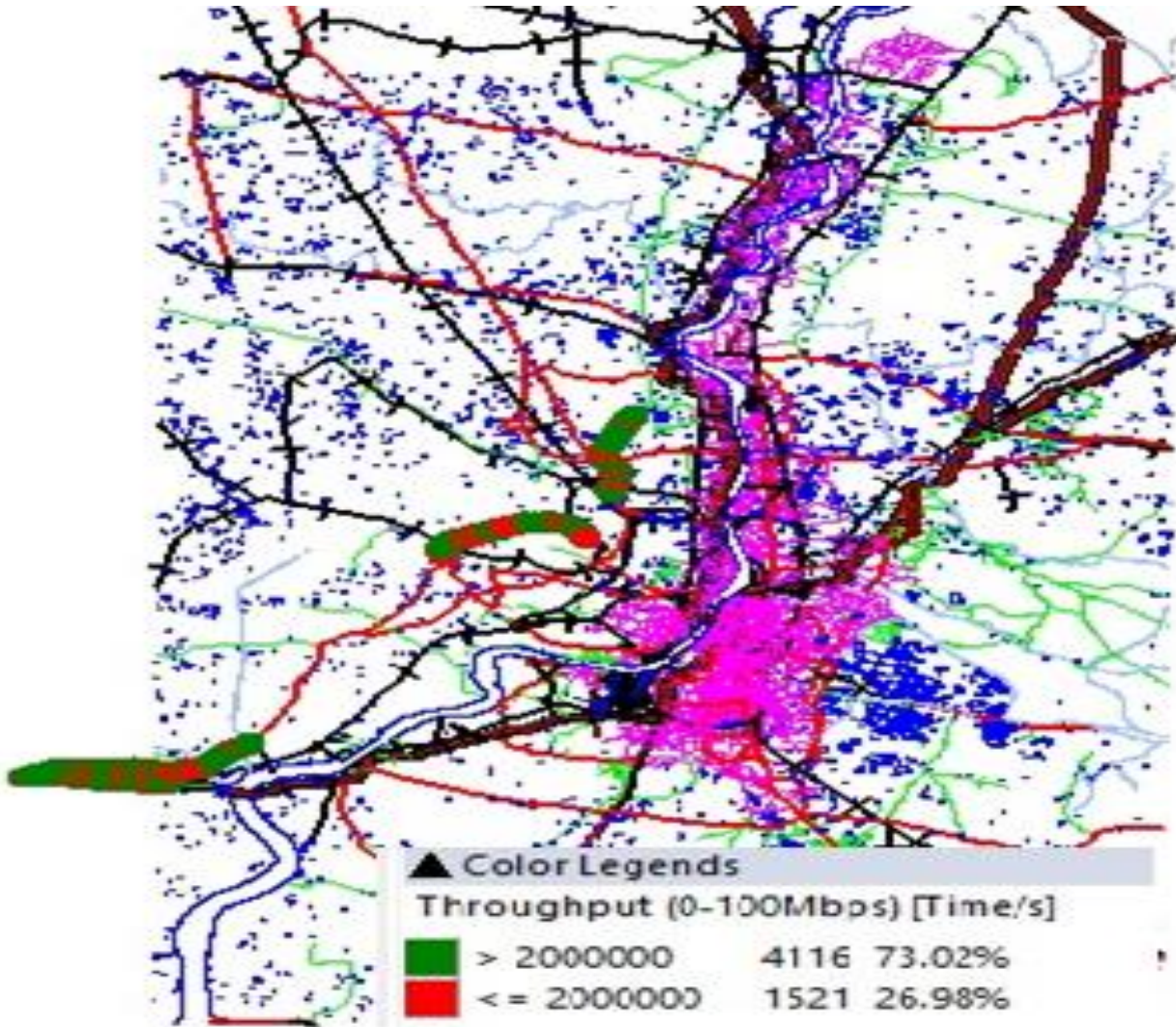
IV. Dynamic Data Test- 4G DL Details

BSNL

Dynamic Data Testing Complete 322 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	6.08

4G



AVG. DOWNLOAD SPEED (Mbps)	6.08
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 1Mbps	12.73
1 to 2 Mbps	11.03
2 to 5 Mbps	23.78
5 to 10 Mbps	27.67
>10 Mbps	24.79
Total	100

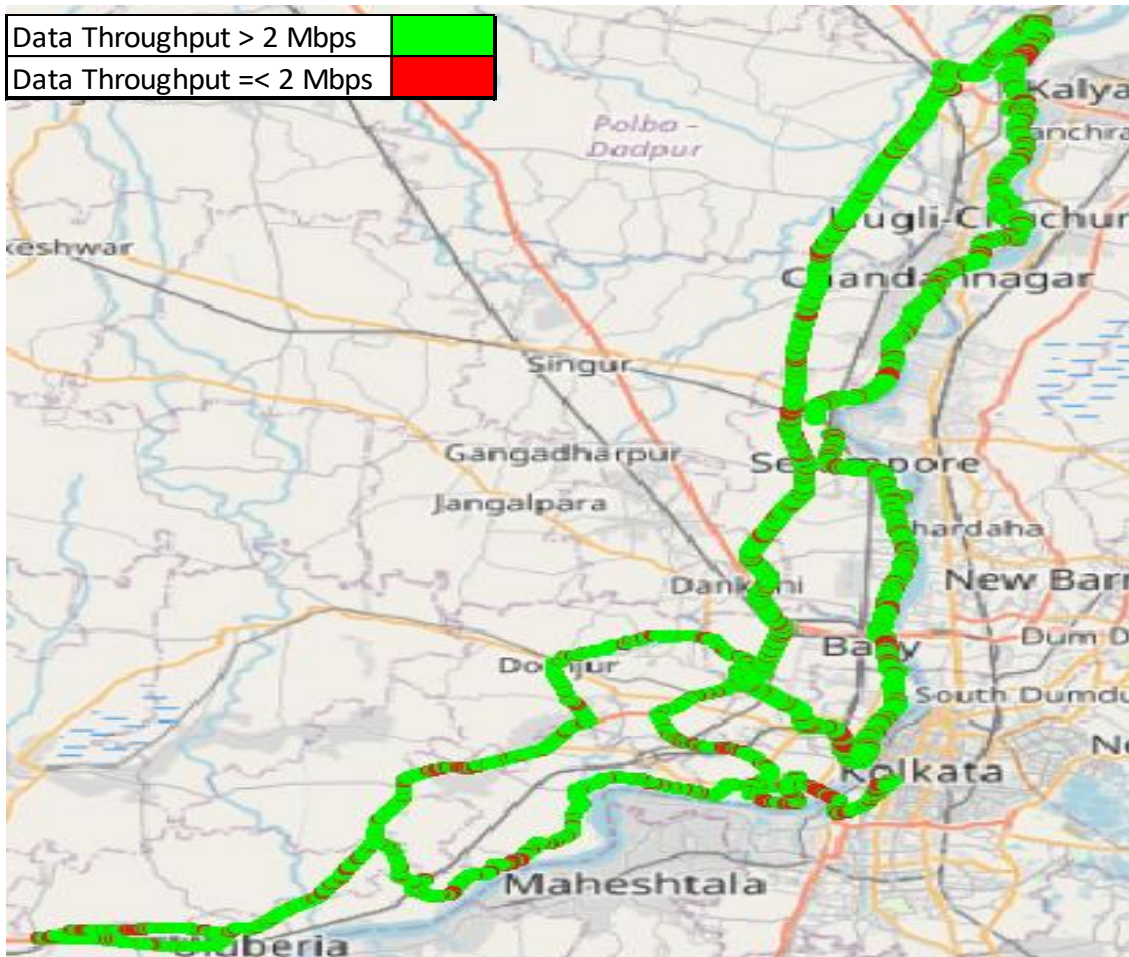
IV. Dynamic Data Test- 4G DL Details

RJIO

Dynamic Data Testing Complete 322 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	7.10

4G



AVG. DOWNLOAD SPEED (Mbps)	7.10
% FILE TRANSFER COMPLETE	100.00
DL throughput	Sample %
0 to 1 Mbps	14
1 to 2 Mbps	8
2 to 5 Mbps	21
5 to 10 Mbps	23
>10 Mbps	34
Total	100

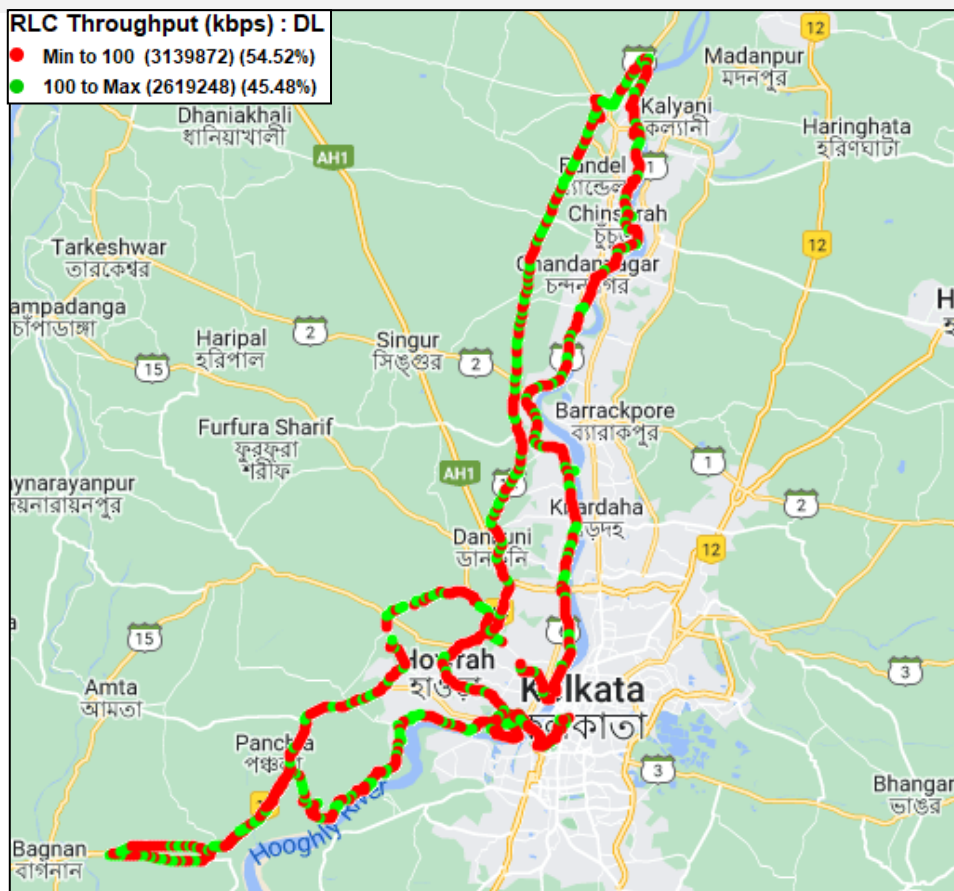
IV. Dynamic Data Test-2G DL Details

VIL

Dynamic Data Testing Complete 322 Kms

Data KPIs – Overall	2G
Average Download Throughput (Kbps)	174.08

2G



AVG. DOWNLOAD SPEED (Kbps)	174.08
% FILE TRANSFER COMPLETE	88.84
DL throughput	Sample %
0 to 50 Kbps	23.29
50 to 100 Kbps	31.23
100 to 200 Kbps	40.92
200 to 300 Kbps	4.52
>300 Kbps	0.04
Total	23.29

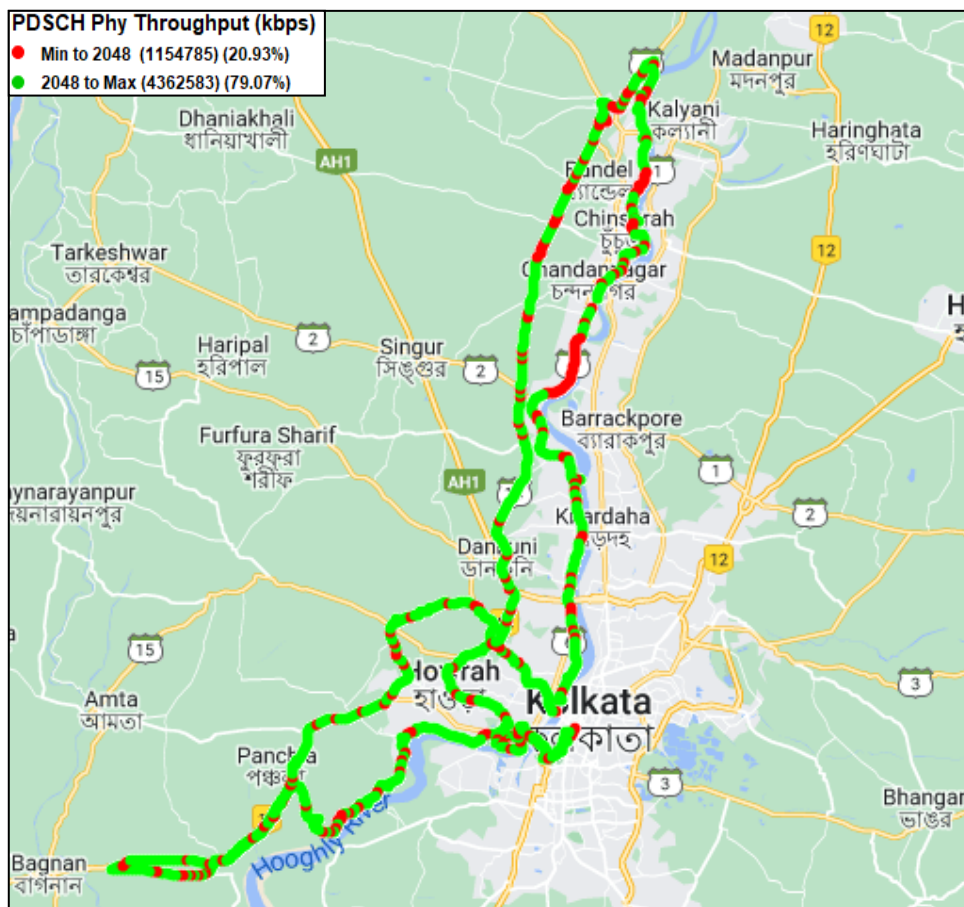
IV. Dynamic Data Test-4G DL Details

VIL

Dynamic Data Testing Complete 322 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	23.75

4G



AVG. DOWNLOAD SPEED (Mbps)	23.75
% FILE TRANSFER COMPLETE	99.13
DL throughput	Sample %
0 to 1 Mbps	3.70
1 to 2 Mbps	17.23
2 to 5 Mbps	31.37
5 to 10 Mbps	28.15
>10 Mbps	19.55
Total	100