Operator Assisted Drive Test Report

Dehradun to Meerut Highway
3rd March 2022
By
TRAI Regional office Bhopal

Key Performance Indicators: All TSPs have met the Drop Call Rate (DCR) benchmark of 2% Except BSNL. All TSPs have met the Call Setup Success Rate (CSSR) of 95%. Rx Quality parameter not achieved by some TSPs

The Operator Assisted Drive Test has been carried out by Regional Office, Bhopal with the help of Telecom Service Providers for Dehradun - Meerut Highway from 9:00 AM to 8:00 PM on 3rd March 2022. The drive test covered drive route of around 210 KMs. More than 160 calls were made for each of the 2G/3G/4G. Networks: three 2G networks, one 3G network, and three LTE networks covering four TSPs.

Overview   Voice Summary   Data Summary

Overview

Regional Office, TRAI Bhopal conducted Operator Assisted Drive Test on 3rd March 2022 covering Dehradun – Merrut Highway. The performance of Airtel, BSNL, Vodafone Idea, and Jio was monitored across various technologies (2G, 3G, and 4G). The test results obtained from these drive tests were utilized to assess the network quality for Voice and Data services.

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

Data: Download Throughputs

Drive Test Details :

Voice Tests: Calls were made for 90-sec duration with a wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately 210 KMs. More than 160 calls were made for each of the 2G/3G/4G networks: three 2G (Lock Mode) networks, one 3G (Dual mode) network and three VoLTE networks covering 4 unique TSPs.

Data Tests:

Dynamic data test was conducted for around 210 km for download throughput in all technologies.
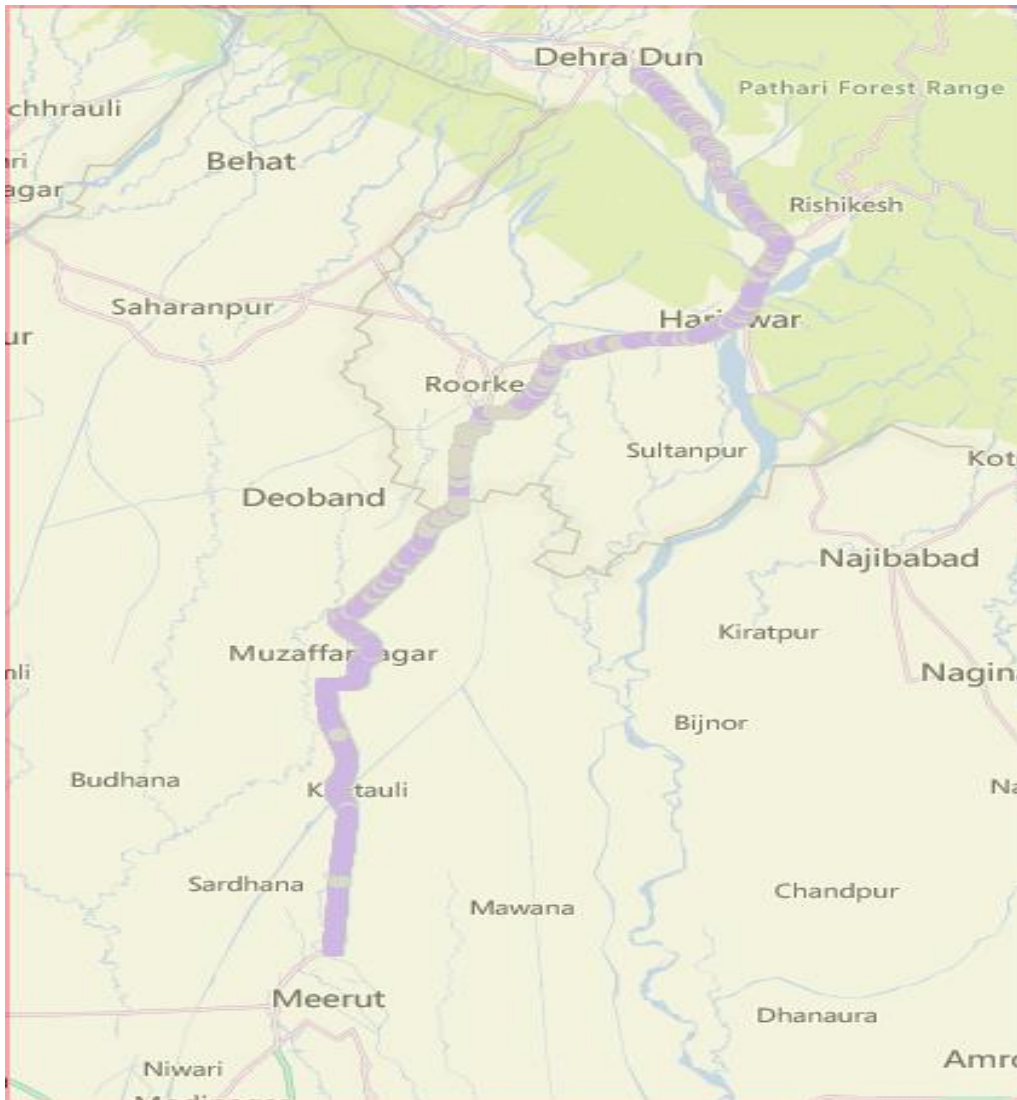
2G – measurement – UE Locked in 2G file size- 500KB

 3G – measurement – UE in 3G   File Size- 20MB

 4G – measurement – UE in LTE File Size- 40MB

.

Voice & Dynamic Data Test Drive Route
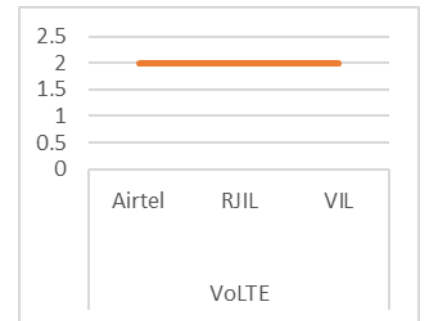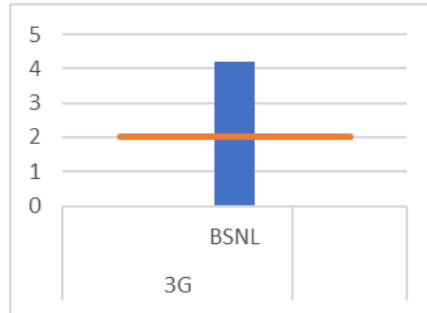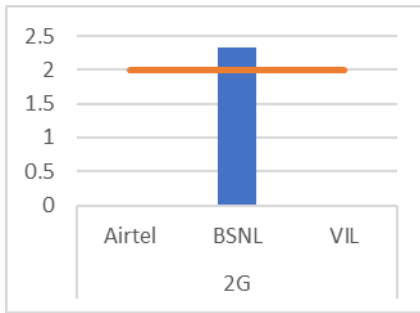

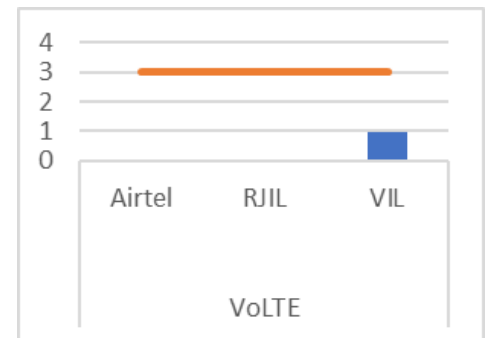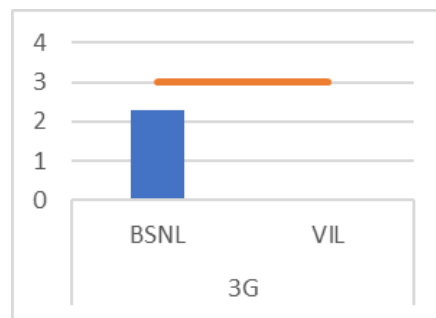| list of important area covered during the drive test |
| --- |
| Dehradun,Haridwar,Roorkee,Mujjafarnagar,Merrut |
| |
| |
| |
| |

Voice Calls

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

Drop Call Rate (%)

Block Call Rate (%)
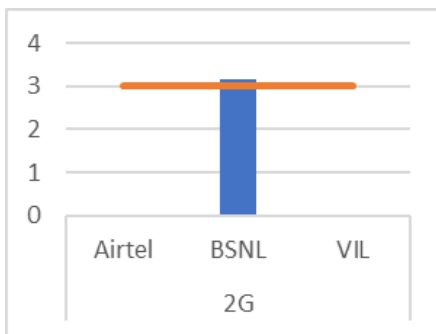
KPIs	2G			3G		VoLTE		
	Airtel	BSNL	VIL	BSNL	VIL	Airtel	RJIL	VIL
Drop Call Rate %	0	2.33	0	4.22	NA	0	0	0
Block Call Rate %	0	3.16	0	2.29	NA	0	0	0.99

a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%)Except BSNLin 2G & 3G .

b) Call Block Rate (CBR%) benchmark of 3% was achieved by all TSP's Except BSNL in 2G.

4

Voice Summary

Voice Calls

Coverage

a) Percentage of coverage samples for 2G **≥** -85 dBm.

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	82	78	82

b) Percentage of coverage samples for 3G ≥ -90 dBm

TSPs	3G	
	BSNL	VIL
Coverage %	52	NA

b) Percentage of coverage samples for LTE ≥ -110 dBm.

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	98	98.14	97.0

c) Percentage of time spent on 3G/4G network

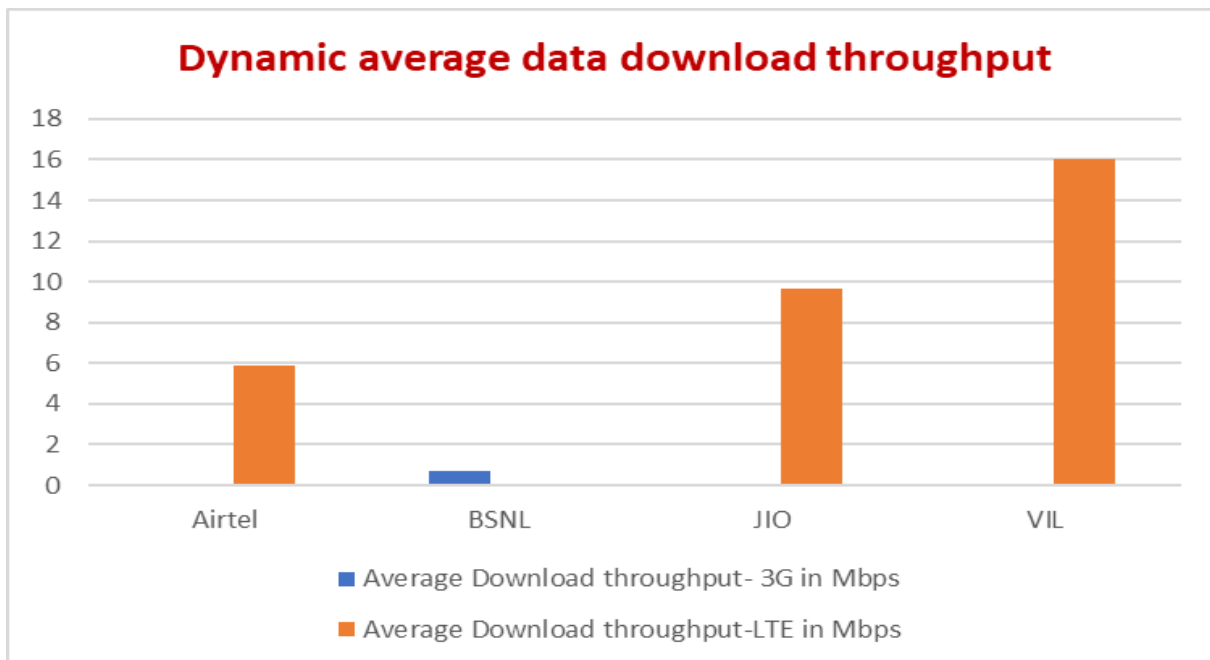| TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	VIL	JIO
Time Spent on 3G/4G %	89	NA	100	NA	100

Data Services Dynamic

Dynamic Data was tested for 210 Kms. Download Throughput was tested.

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:

TSP	Airtel	BSNL	JIO	VIL
Average Download throughput- 2G In Kbps	71.47	5.7	NA	NA
Average Download throughput- 3G In Mbps	NA	0.693	NA	NA
Average Download throughput-LTE In Mbps	5.87	NA	9.67	16

6

Data Summary

Summary

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Call attempts	160	221	NA	168
Block call rate %	0.62	**3.16**	NA	0
CSSR %	99.35	96.84	NA	100
Drop call rate %	0	**2.33**	NA	0
Mobility HOSR %	99.1	96.67	NA	98.07
RX Quality %	**90**	97	NA	**74**
Average CST Sec	3.9	3.35	NA	3.26

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Call attempts	NA	**218**	NA	NA
Block call rate %	NA	**2.29**	NA	NA
CSSR %	NA	**97.71**	NA	NA
Drop call rate %	NA	**4.22**	NA	NA
Mobility HOSR %	NA	**100**	NA	NA
RX Quality %	NA	**75**	NA	NA
Average CST (Sec)	NA	**3.56**	NA	NA

TSP (For VoLTE)	Airtel	BSNL	JIO	VIL
Call attempts	159	NA	204	171
Block call rate %	0	NA	0.00	0.98
CSSR %	100	NA	97.55	98.34
Drop call rate %	0	NA	0.00	0
Mobility HOSR %	99.6	NA	98.50	99.26
RX Quality %	**80**	NA	96.85	**76.7**
Average CST(Sec)	1.7	NA	0.76	3.02

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 ≥ -110dBm. The details are as follows.
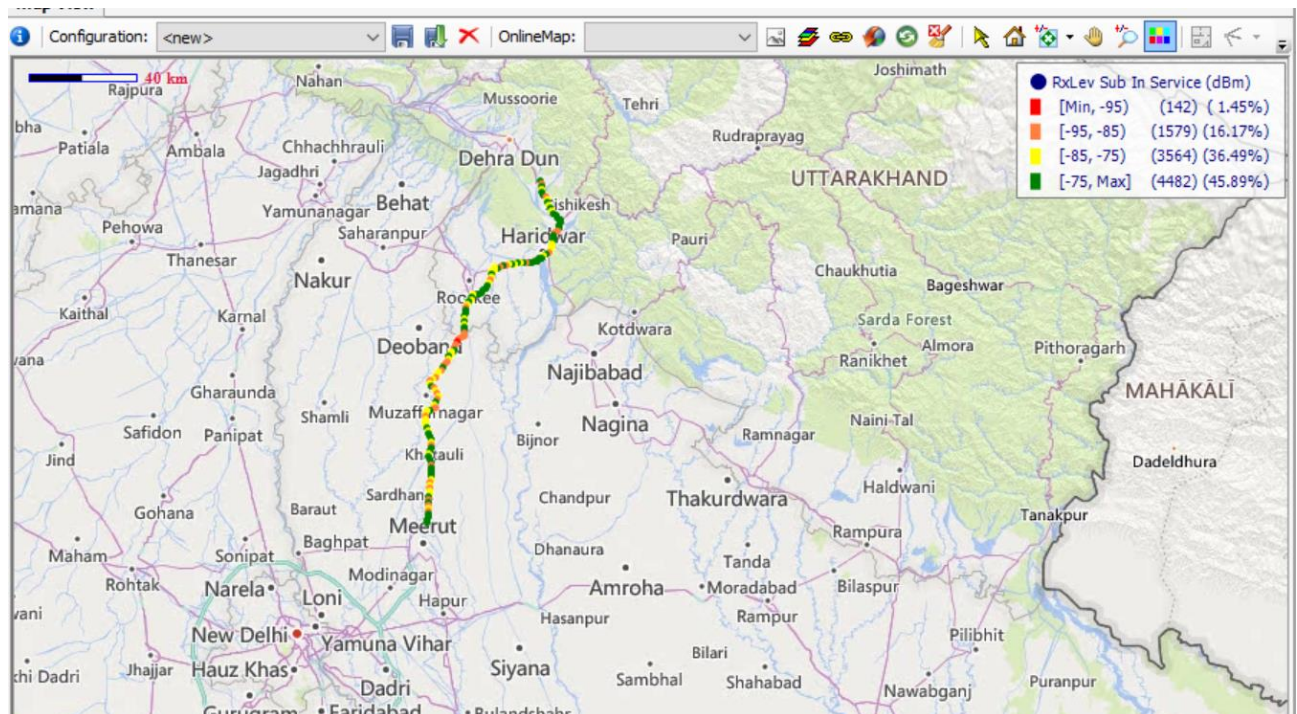
TSP	Coverage Rate %
Airtel 2G	83
BSNl 2G	78
VIL 2G	83
BSNL 3G	52
VIL 3G	NA
Airtel VoLTE	98
Jio VoLTE	98.14
VIL VoLTE	97.0
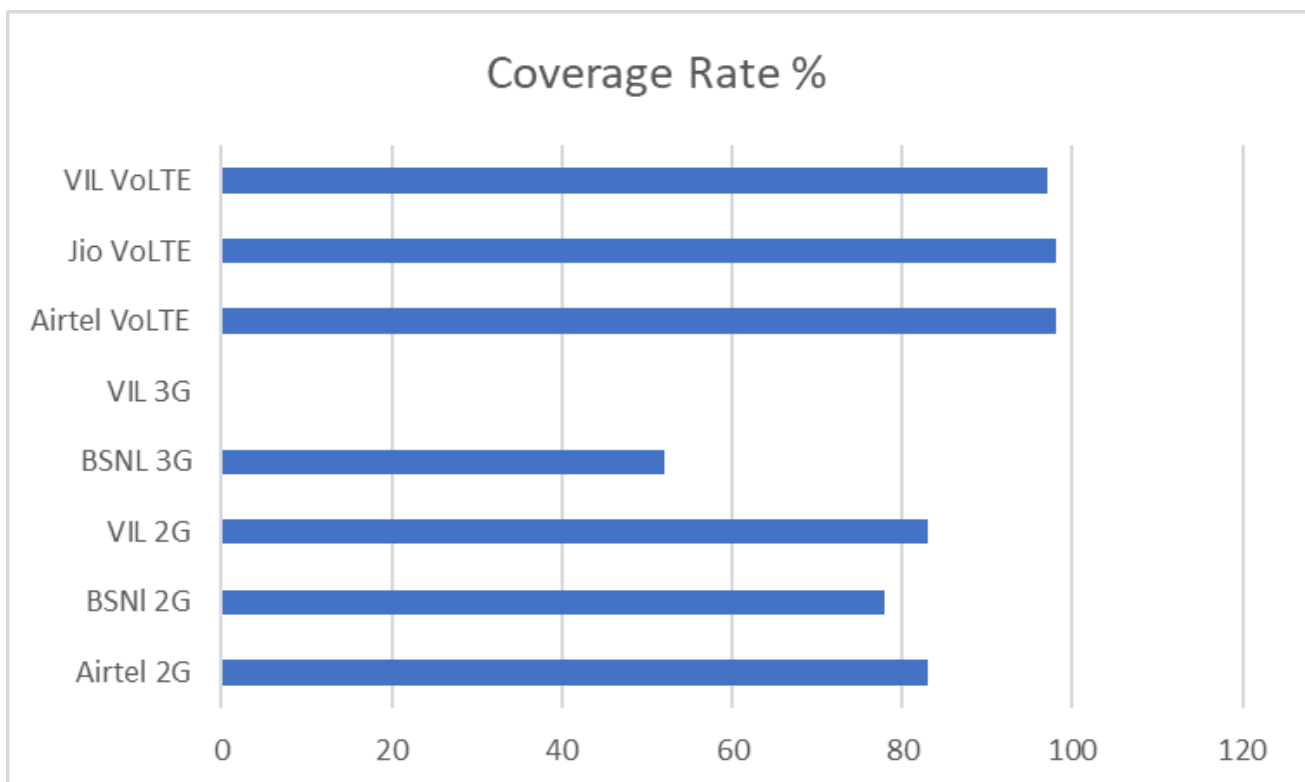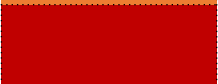
Coverage Rate %

TSP-Airtel

Technology	Coverage %
2G	83

2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	4482	47%	
[-75, >=-85)	3564	36%	
[-85, >=-95)	1579	16%	
[-95, >=Min)	143	1%	
Total	9768		

9

TSP-BSNL

Technology	Coverage %
2G	78%

Device – 1 Phone Qualcomm (1) + 2G_Voice + 404546140685616 – RxLev Sub (dBm)
- -75 to 0 (52%) (6241)
- -85 to -75 (26%) (3139)
- -95 to -85 (17%) (2007)
- -120 to -95 (5%) (608)
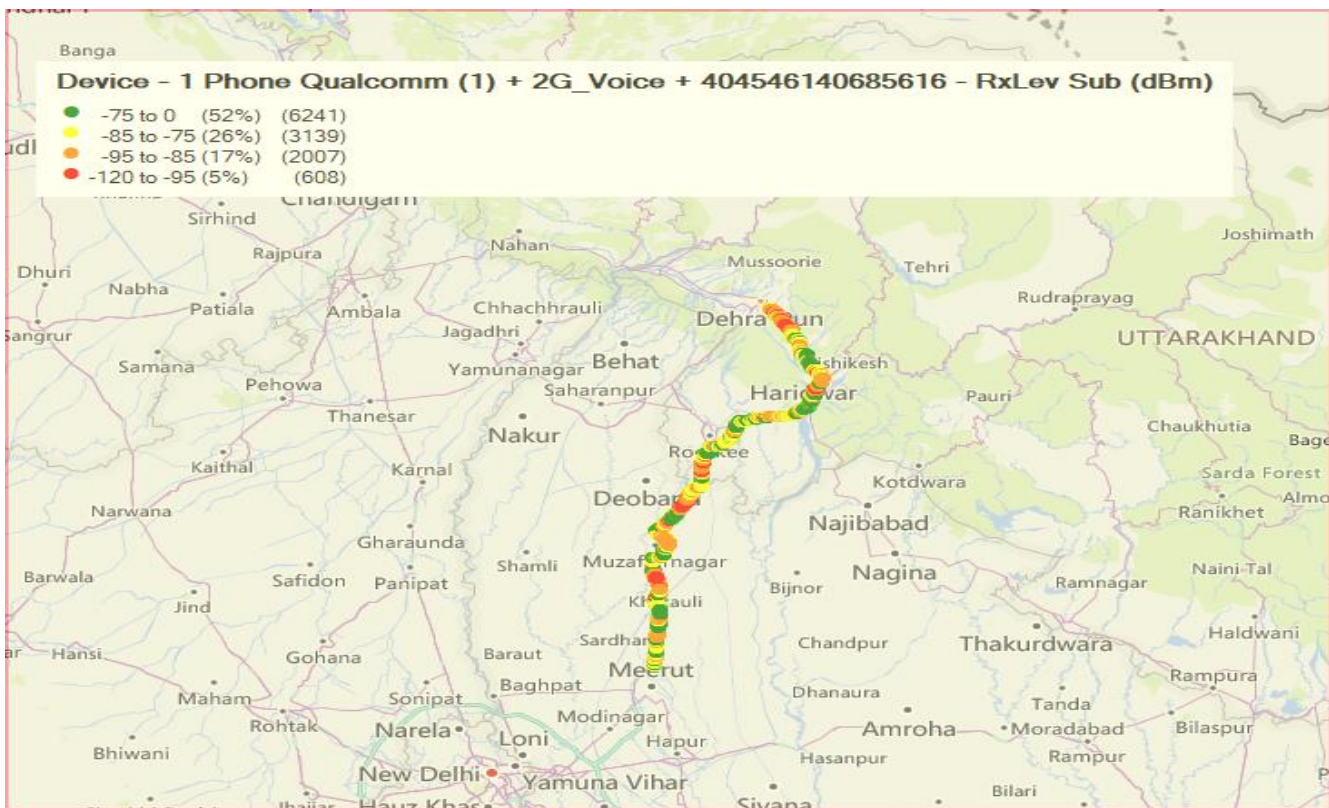
2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	6241	52%	
[-75, >=-85)	3139	26%	
[-85, >=-95)	2007	17%	
[-95, >=Min)	608	5%	
Total	11995	100%	

TSP- VIL

Technology	Coverage %
2G	83
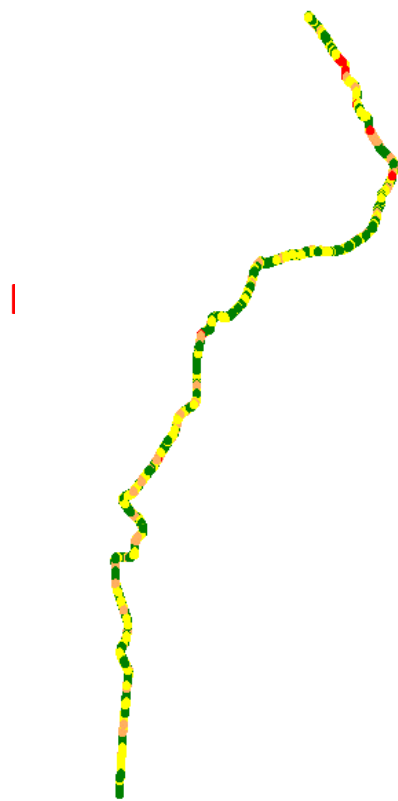
2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	**919777**	**43**	
[-75, >=-85)	**840526**	**40**	
[-85, >=-95)	**340691**	**16**	
[-95, >=Min)	**31137**	**1**	
Total	**2132131**	**100**	

11

TSP- BSNL

Technology	Coverage %
3G	52%

Device – 2 Phone Qualcomm (2) + Dual Mode + 404546161841423 – UMTS Best Active RSCP (dBm)
- -70 to 0   (7%)   (733)
- -80 to -70 (24%)   (2540)
- -90 to -80 (21%)   (2209)
- -120 to -90 (48%)   (4980)
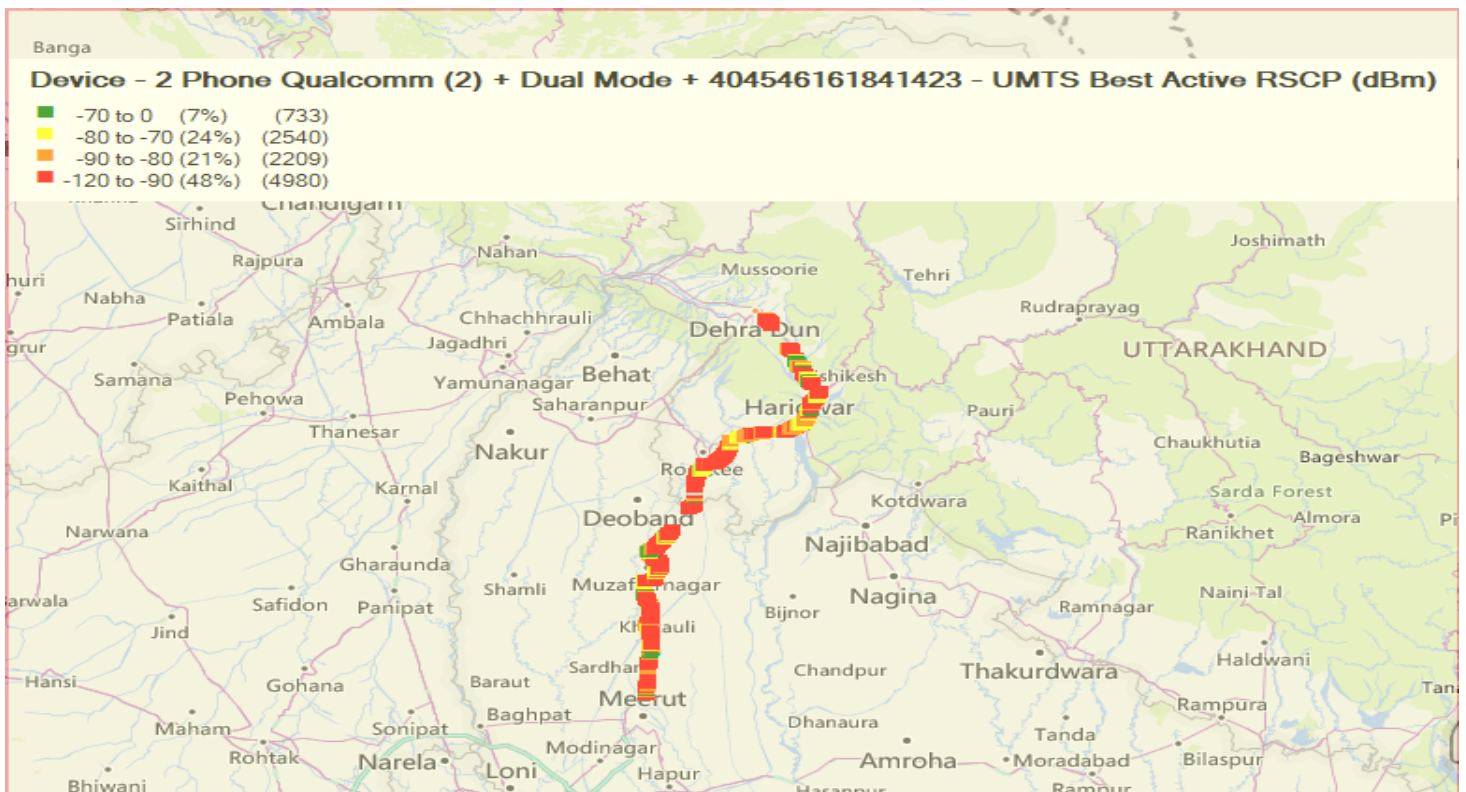
3G			
Overall RSCP	**# Samples**	**% PDF**	**Legends**
[Max, >=-70]	733	7%	
[-70, >=-80)	2540	24%	
[-80, >=-90)	2209	21%	
[-90, >=Min)	4980	48%	
Total			

TSP- Airtel

Technology	Coverage %
VoLTE	98
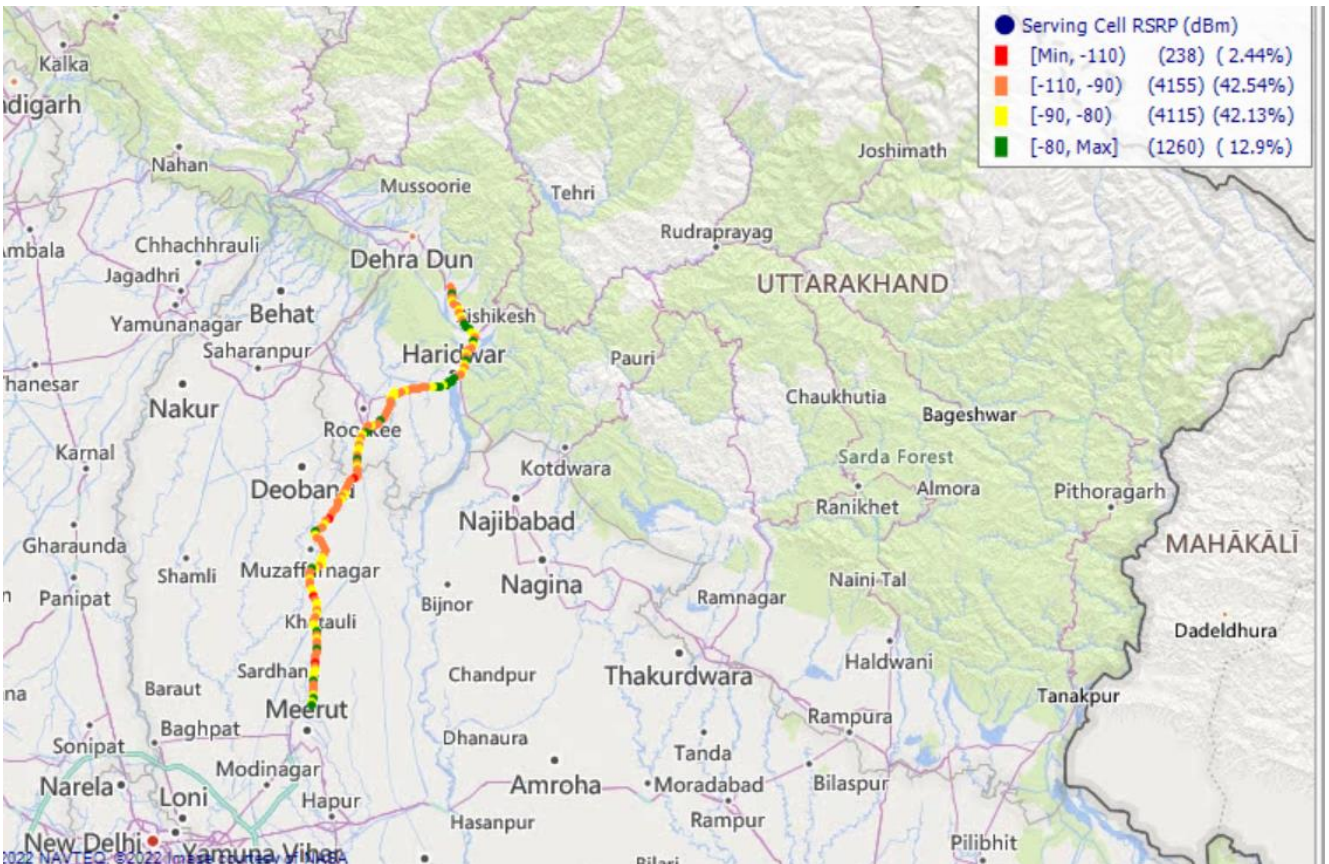
VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	1260	13%	
[-80, >=-90)	4155	43%	
[-90, >=-110)	4115	42%	
[-110, >=Min)	238	2%	
Total	9768		

13

TSP- JIO

Technology	Coverage %
VoLTE	98.14%
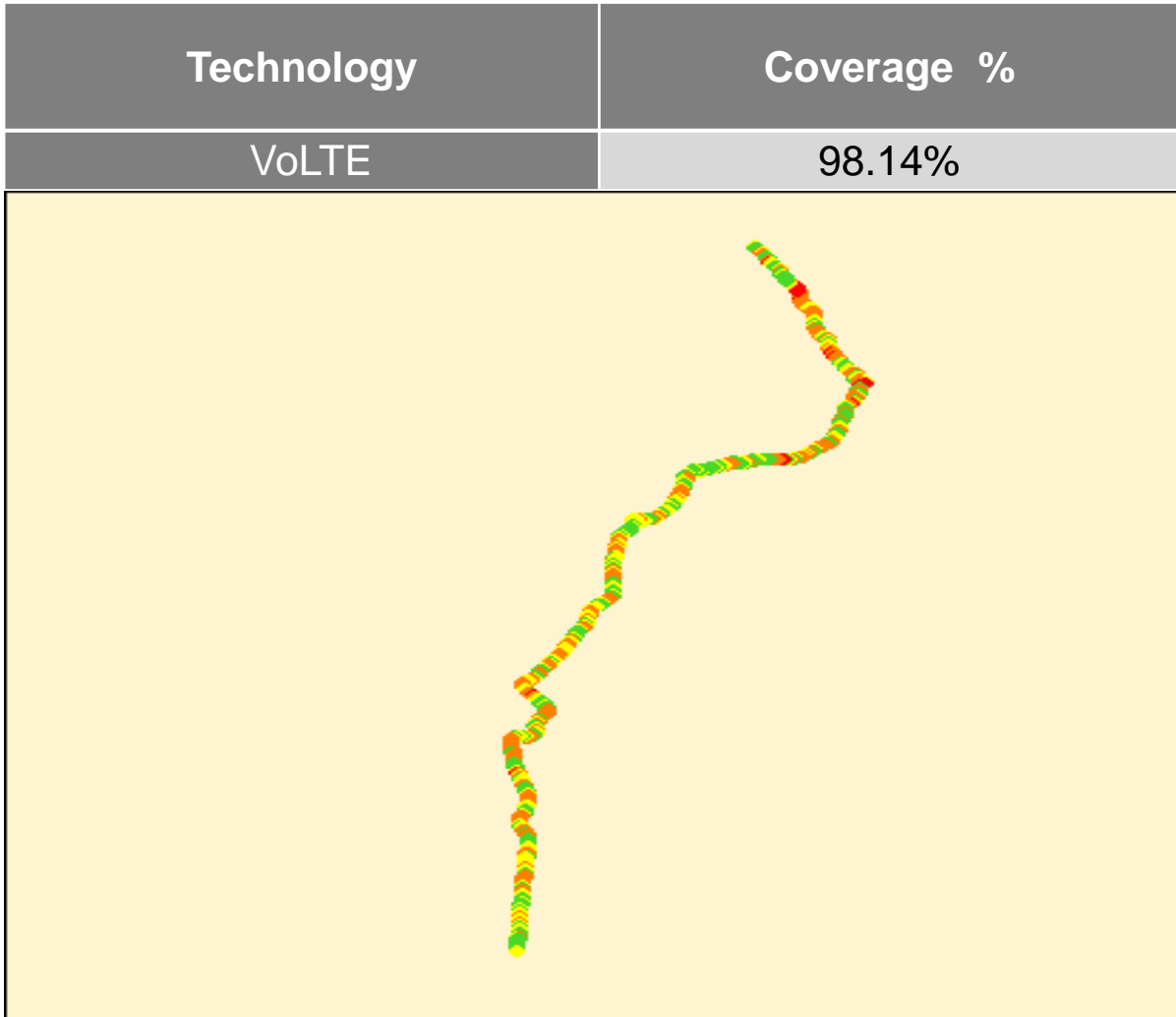
VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	**6479**	**29.95%**	
[-80, >=-90)	**7868**	**36.37%**	
[-90, >=-110)	**6886**	**31.83%**	
[-110, >=Min)	**402**	**1.86%**	
Total			

14

TSP- VIL

Technology	Coverage %
VoLTE	97

VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	535685	18	
[-80, >=-90)	861107	29	
[-90, >=-110)	1478773	50	
[-110, >=Min)	86851	3	
Total	**740604**		

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand 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 ≥ 95%.

TSP	Rx Quality %
Airtel 2G	89
BSNl 2G	97
VIL 2G	90
BSNL 3G	75
VIL 3G	NA
Airtel VoLTE	80
Jio VoLTE	96.86
VIL VoLTE	76.7
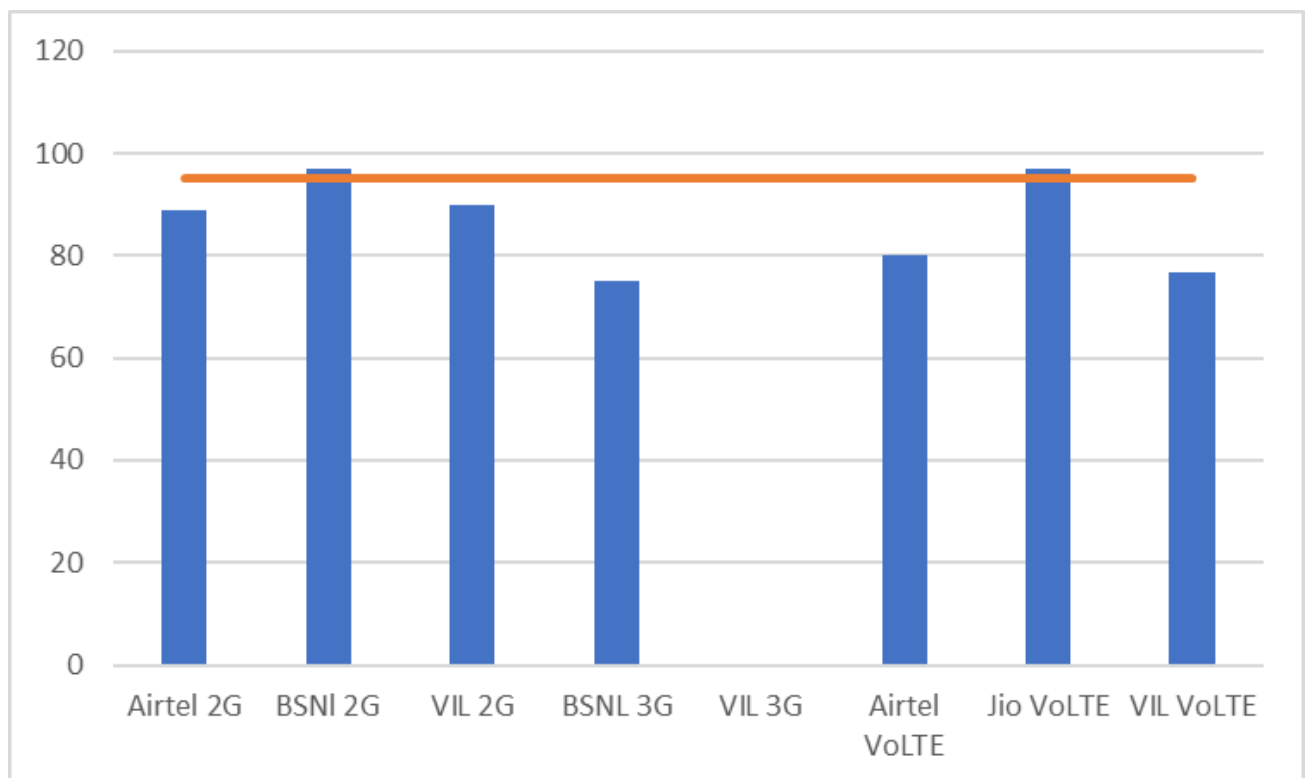
16

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand 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 ≥ 95%.

TSP- Airtel

Technology	Rx Quality %
2G	89
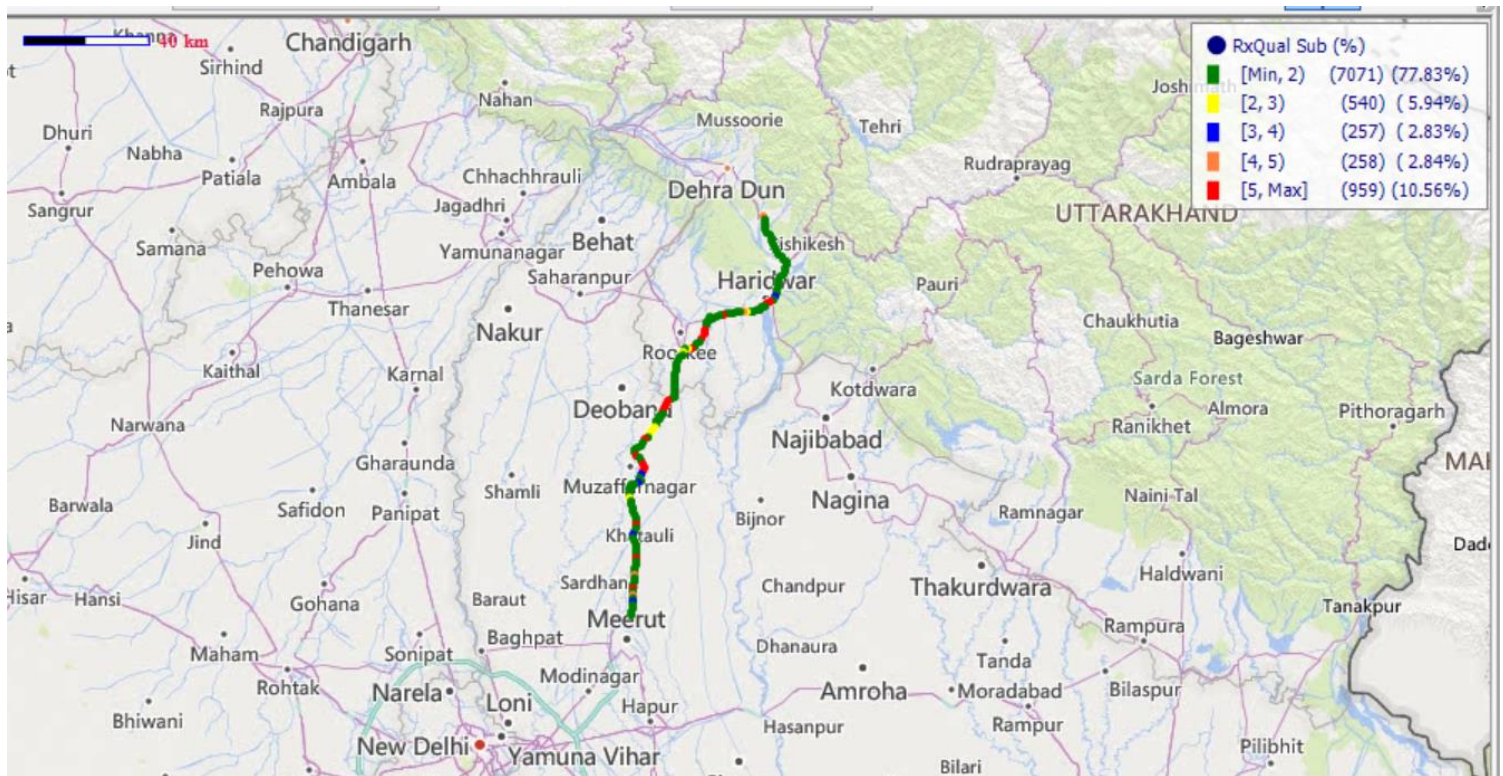
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	7071	78%	🟩
(2, <=3)	540	6%	🟨
(3 , <=4)	257	3%	🟦
(4 , <=5)	258	3%	🟧
(5 , <=Max)	958	11%	🟥
Total	9084		

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand 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 ≥ 95%.
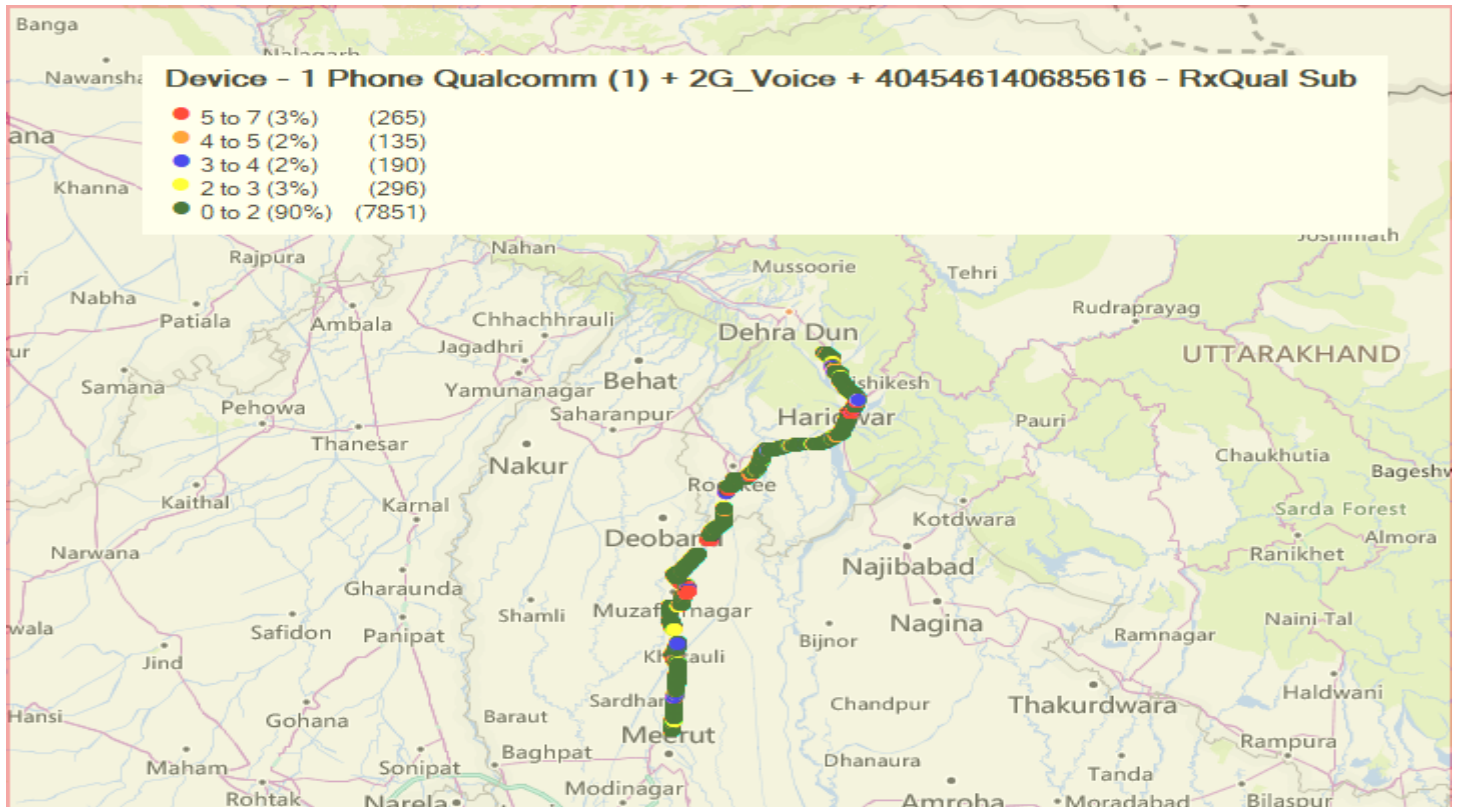
TSP- BSNL

Technology	Rx Quality %
2G	97%

Device – 1 Phone Qualcomm (1) + 2G_Voice + 404546140685616 – RxQual Sub
- 5 to 7 (3%)   (265)
- 4 to 5 (2%)   (135)
- 3 to 4 (2%)   (190)
- 2 to 3 (3%)   (296)
- 0 to 2 (90%) (7851)

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	7851	90%	
(2, <=3)	296	3%	
(3 , <=4)	190	2%	
(4 , <=5)	135	2%	
(5 , <=Max)	265	3%	
Total	8737	100%	

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand 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 ≥ 95%.

TSP-VIL

Technology	Rx Quality %
2G	90
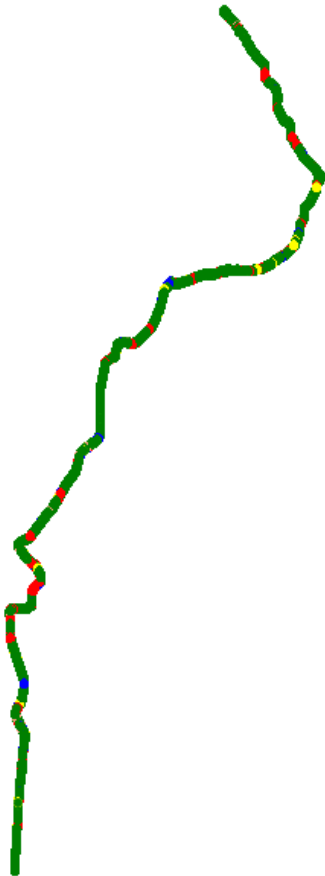
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1780028	83	
(2, <=3)	44779	2	
(3 , <=4)	50143	2	
(4 , <=5)	50771	3	
(5 , <=Max)	219590	10	
Total	2145311	100	

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand 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 ≥ 95%.

TSP- BSNL

Technology	Rx Quality %
3G	75%
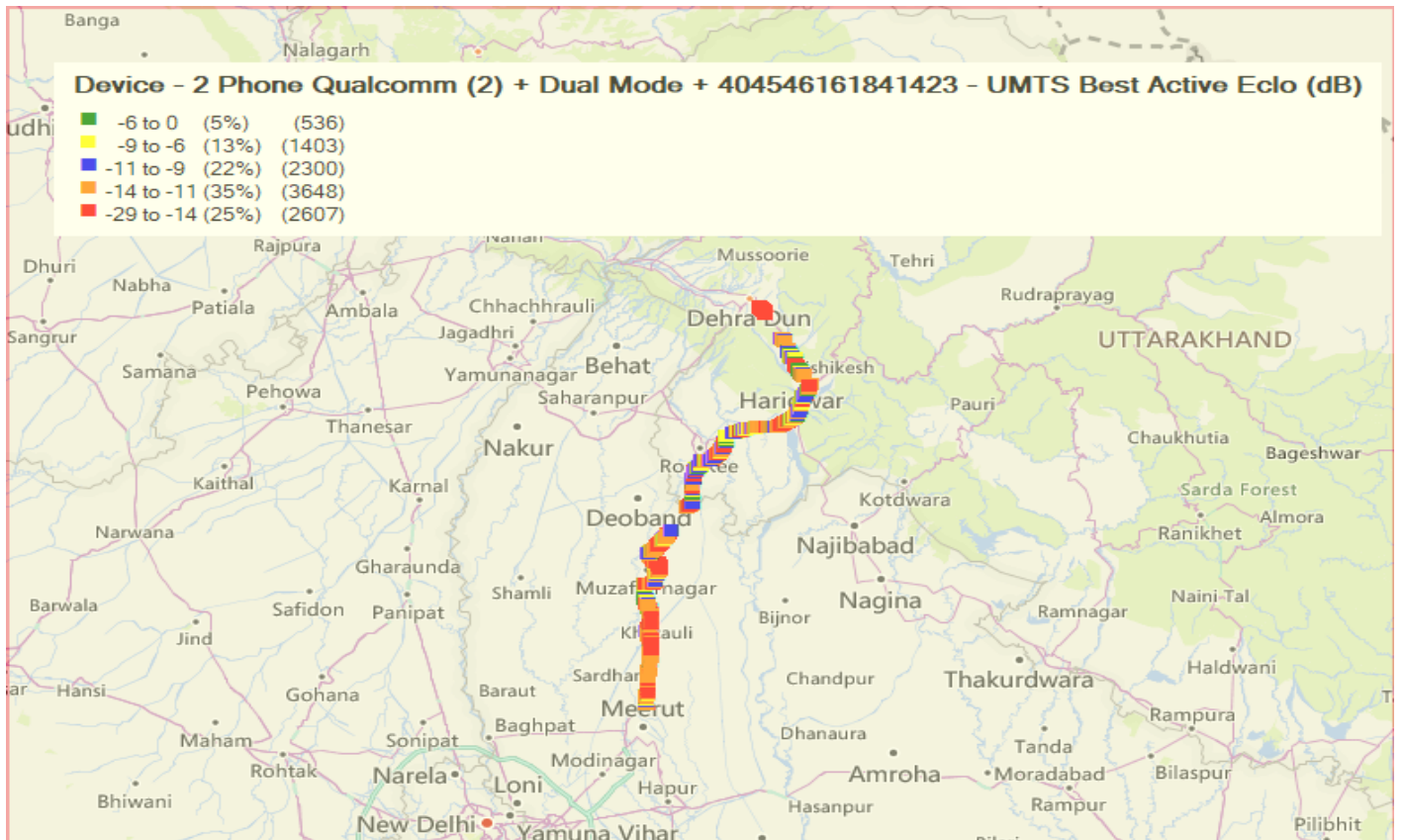
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	536	5%	
(-6, <=-9)	1403	13%	
(-9, <=-11)	2300	22%	
(-11, <=-14)	3648	35%	
(-14, <= Min)	2607	25%	
Total			

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand 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 ≥ 95%.

TSP-Airtel

Technology	Rx Quality %
VoLTE	80
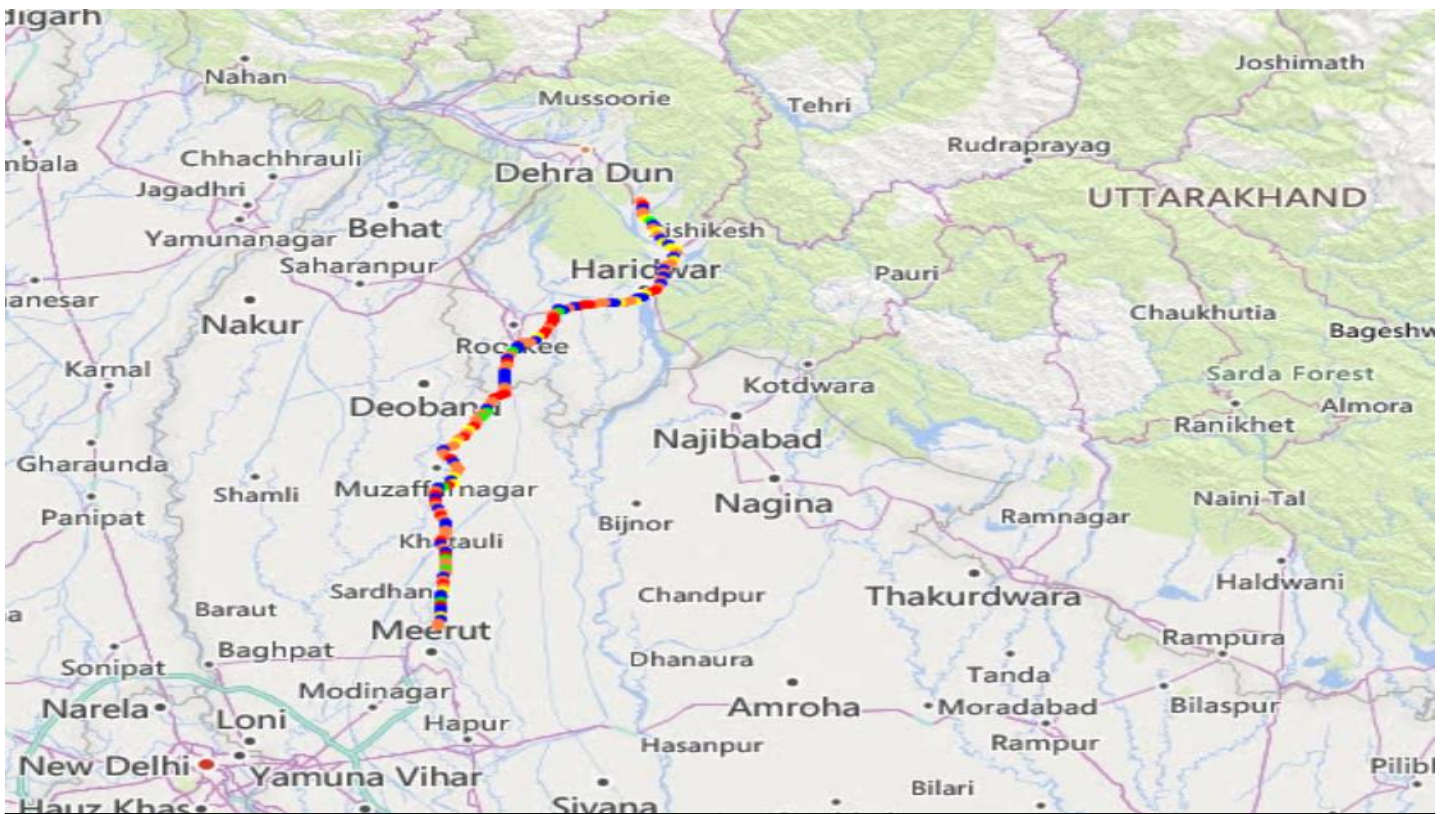
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	2014	20%	
(0, <=5)	4205	43%	
(5, <=10)	1914	20%	
(10, <=15)	799	8%	
(15, <=Max)	836	9%	
Total	9768		

21

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand 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 ≥ 95%.

TSP- JIO

Technology	Rx Quality %
VoLTE	96.85
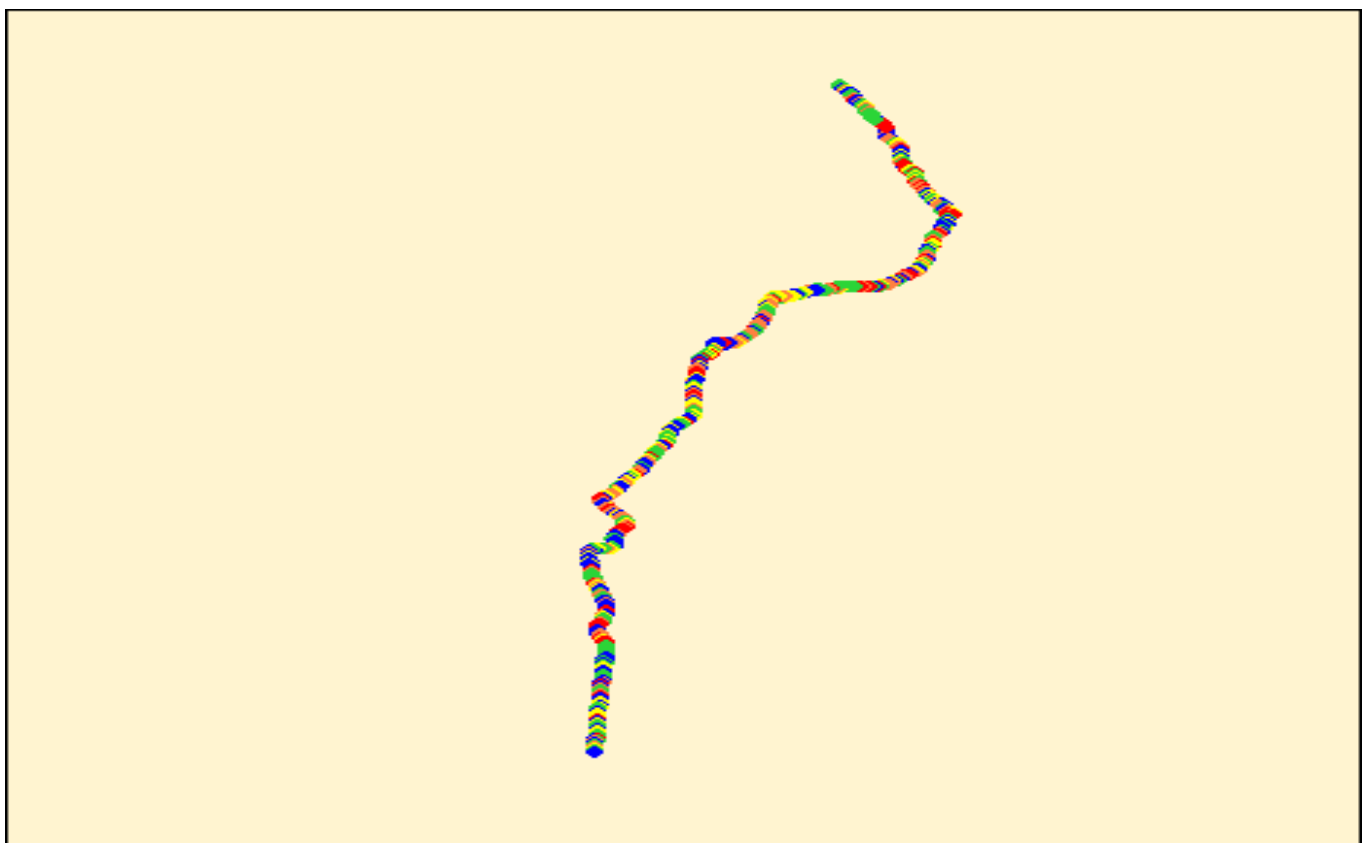
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	666	3.15%	
(0, <=5)	5143	24.31%	
(5, <=10)	5532	26.14%	
(10, <=15)	4219	19.94%	
(15, <=Max)	5599	26.46%	
Total	21159		

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand 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 ≥ 95%.

TSP-VIL

Technology	Rx Quality %
VoLTE	76.7
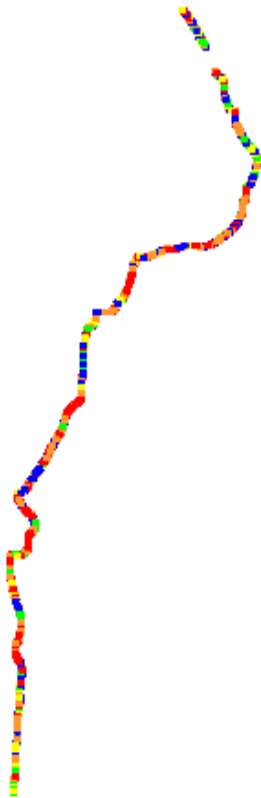
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	687876	23	
(0, <=5)	766113	26	
(5, <=10)	695445	23	
(10, <=15)	501240	17	
(15, <=Max)	311742	11	
Total	2962416		

23

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	89
VIL 3G	NA
Airtel VoLTE	100
Jio VoLTE	100
VIL VoLTE	99.16

% of Time Spent on 3G/VoLTE

24
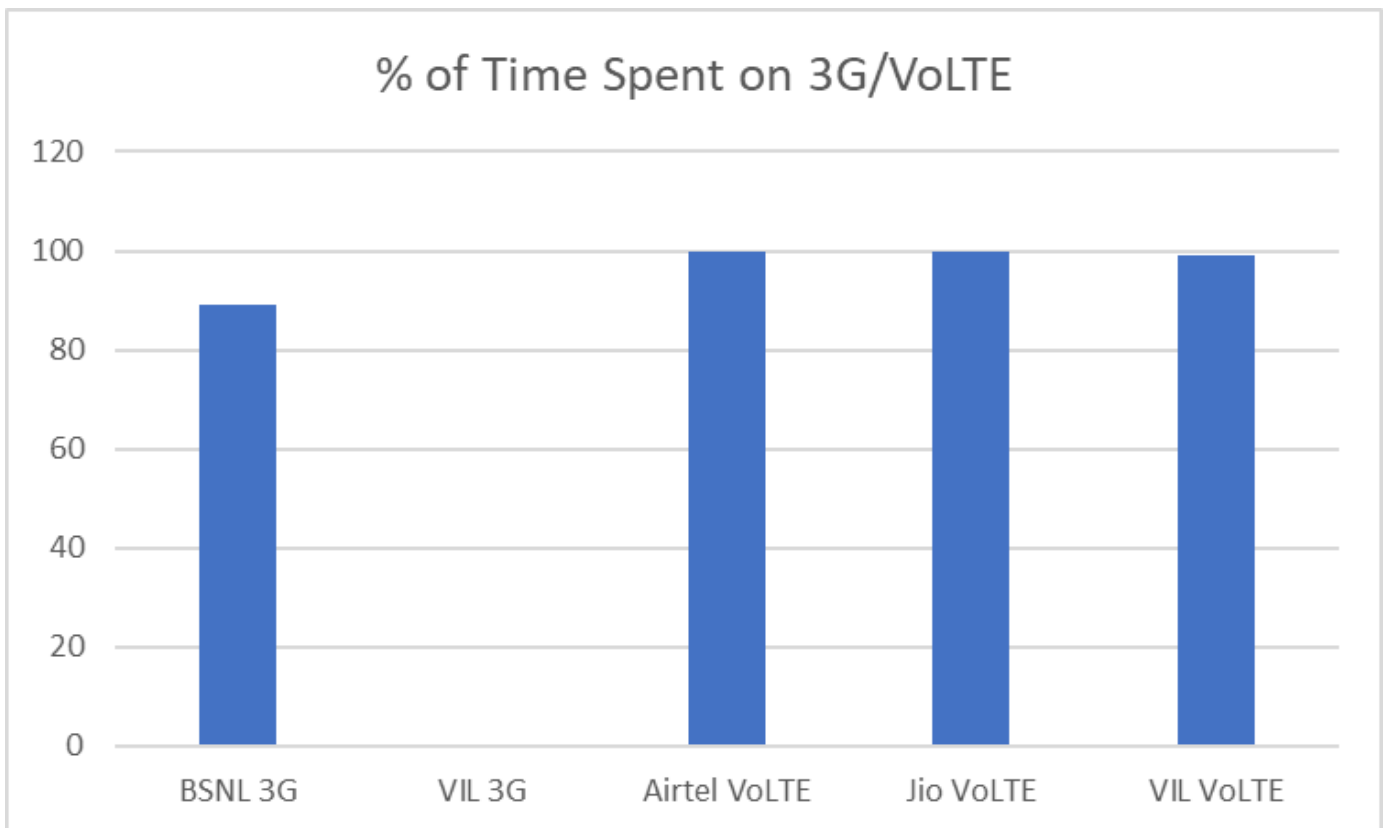
TSP - Airtel

Technology	% of Time Spent on
3G	NA
VoLTE	100
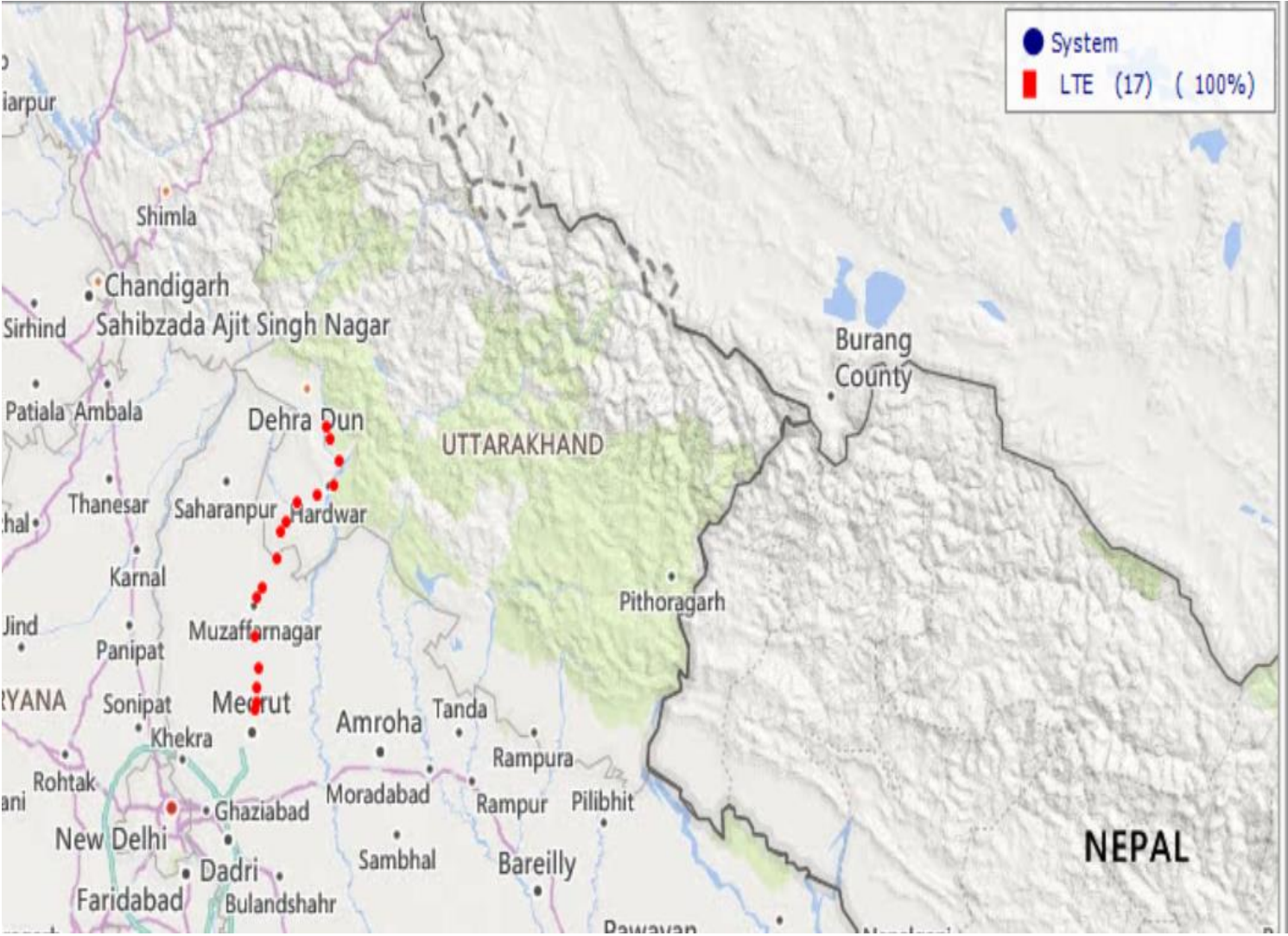
TSP- BSNL

Technology	% of Time Spent on
3G	89%
VoLTE	NA

Device – 2 Phone Qualcomm (2) + Dual Mode + 404546161841423 – Band Info

- GSM 900 (11%)   (984)
- GSM-900 (0%)   (1)
- UMTS FDD 2100 (0%)   (2)
- UMTS FDD AWS 1700 (0%)   (1)
- UMTS FDD IMT 2100 (89%)   (7782)
- UMTS FDD PCS 1900 (0%)   (1)
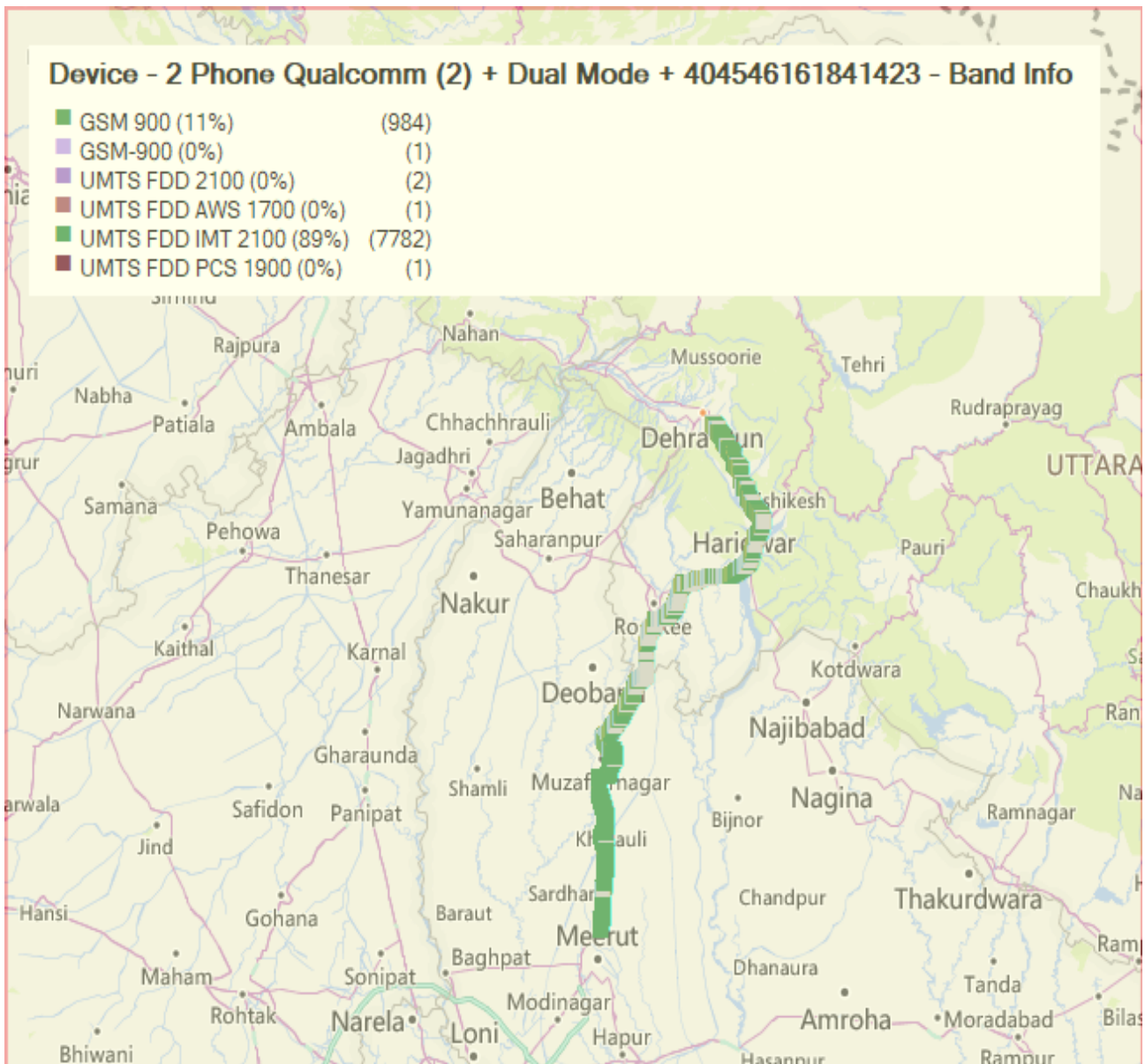
TSP- VIL

Technology	% of Time Spent on
3G	NA
VoLTE	Not provided
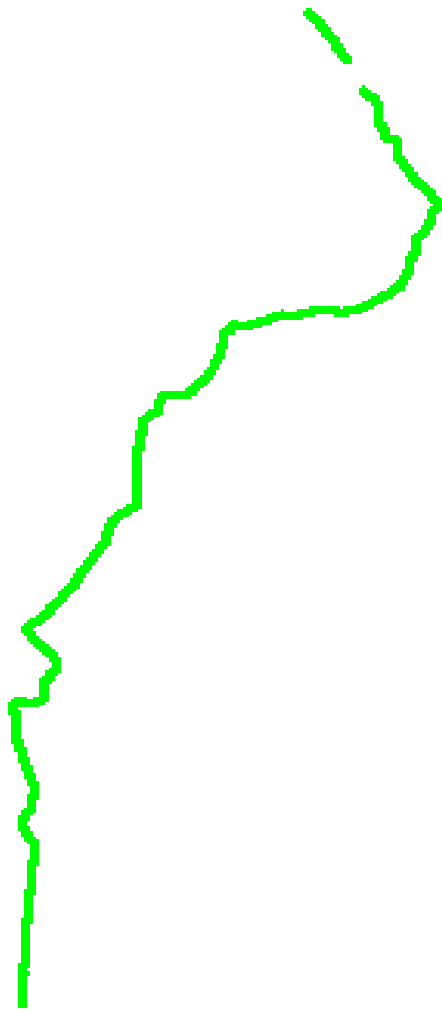
TSP- Airtel

Data Statistics - Dynamic data testing -210 Kms

Data KPIs - Overall	2G
Download Throughput (Kbps)	71.47

Plot: ftp_download_throughput

0 to 100 (5598 : 62.89%)
100 to 150 (1706 : 19.17%)
150 to 200 (1298 : 14.58%)
200 to 10000 (299 : 3.36%)

DL throughput	No of Sample	%	Legends
< 100 Kbps	5598	62.89181	
100-150Kbps	1706	19.16639	
150-200Kbps	1298	14.58263	
>200Kbps	299	3.359173	

TSP- BSNL

Data Statistics - Dynamic data testing - 210Kms

Data KPIs - Overall	2G
Download Throughput (Kbps)	5.7kbps

Device - 1 LTE UE EQ1:sm-g900i:404546180004693 – UMTS Downlink RLC Throughput (kbps)
- 200 to 102,400 (0%)   (42)
- 150 to 200   (0%)   (15)
- 100 to 150   (0%)   (2)
- 0 to 100   (99%)   (11671)
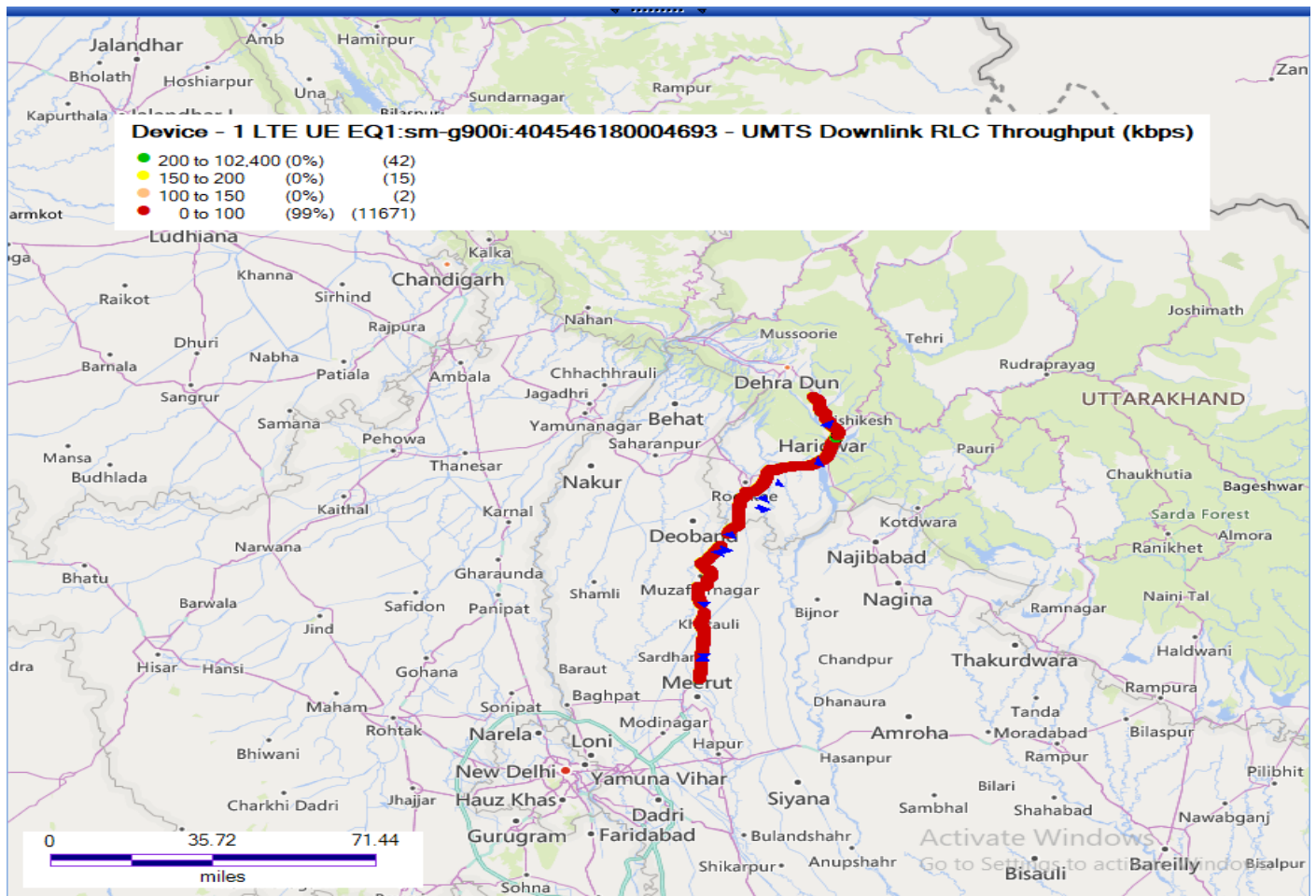
DL throughput	No of Sample	%	Legends
< 100 Kbps	11671	99%	
100-150Kbps	2	0%	
150-200Kbps	15	0%	
>200Kbps	42	0%	

TSP- BSNL

Data Statistics - Dynamic data testing -   210Kms

Data KPIs - Overall	3G
Download Throughput (Mbps)	0.693 Mbps

Device – 1 Phone EQ1:sm-a500g odm diag:404541147791511 – UMTS Downlink RLC Throughput (kbps)

- 10,240 to 20,480 (0%)   (0)
- 5,120 to 10,240 (0%)   (27)
- 1,024 to 5,120 (17%) (1317)
- 0 to 1,024 (83%) (6420)
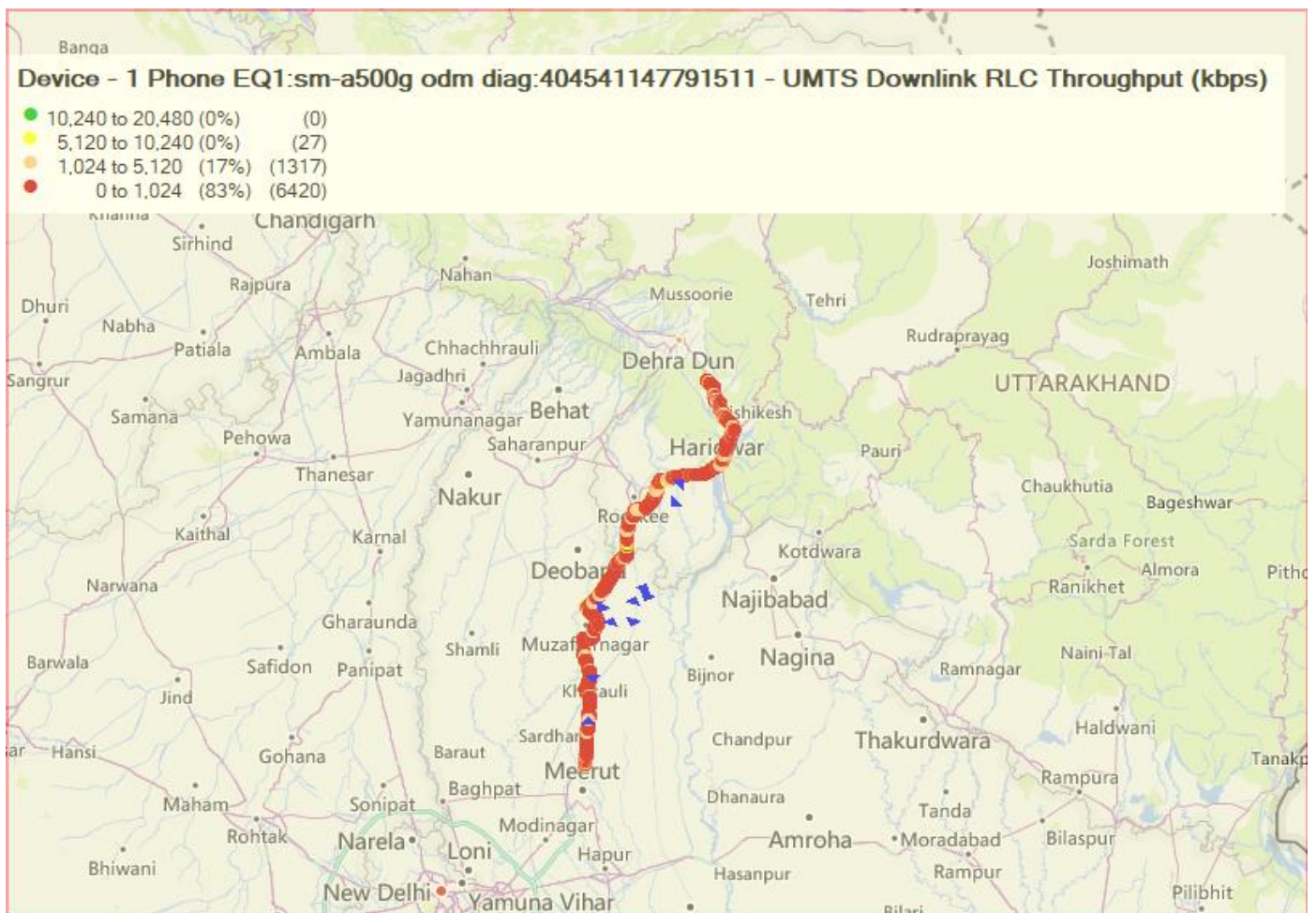
DL throughput	No of Sample	%	Legends
< 1 Mbps	6420	83%	
1-5 Mbps	1317	17%	
5-10 Mbps	27	0%	
>10Mbps	0	0%	

TSP- Airtel

Data Statistics - Dynamic data testing – 210 Kms

Data KPIs - Overall	LTE
Download Throughput (Mbps)	**5.87**

Plot: ftp_download_throughput

Legend:
- 0 to 100 (3607 : 41.22%)
- 100 to 150 (630 : 7.20%)
- 150 to 200 (388 : 4.43%)
- 200 to 10000 (4125 : 47.14%)

DL throughput	No of Sample	%	Legends
< 2Mbps	3607	41.22	
2-5 Mbps	630	7.20	
5-10 Mbps	388	4.43	
>10Mbps	4125	47.14	

Dynamic Data Test

TSP- JIO

Data Statistics - Dynamic data testing – 210 Kms

Data KPIs - Overall	LTE
Download Throughput (Mbps)	9.67
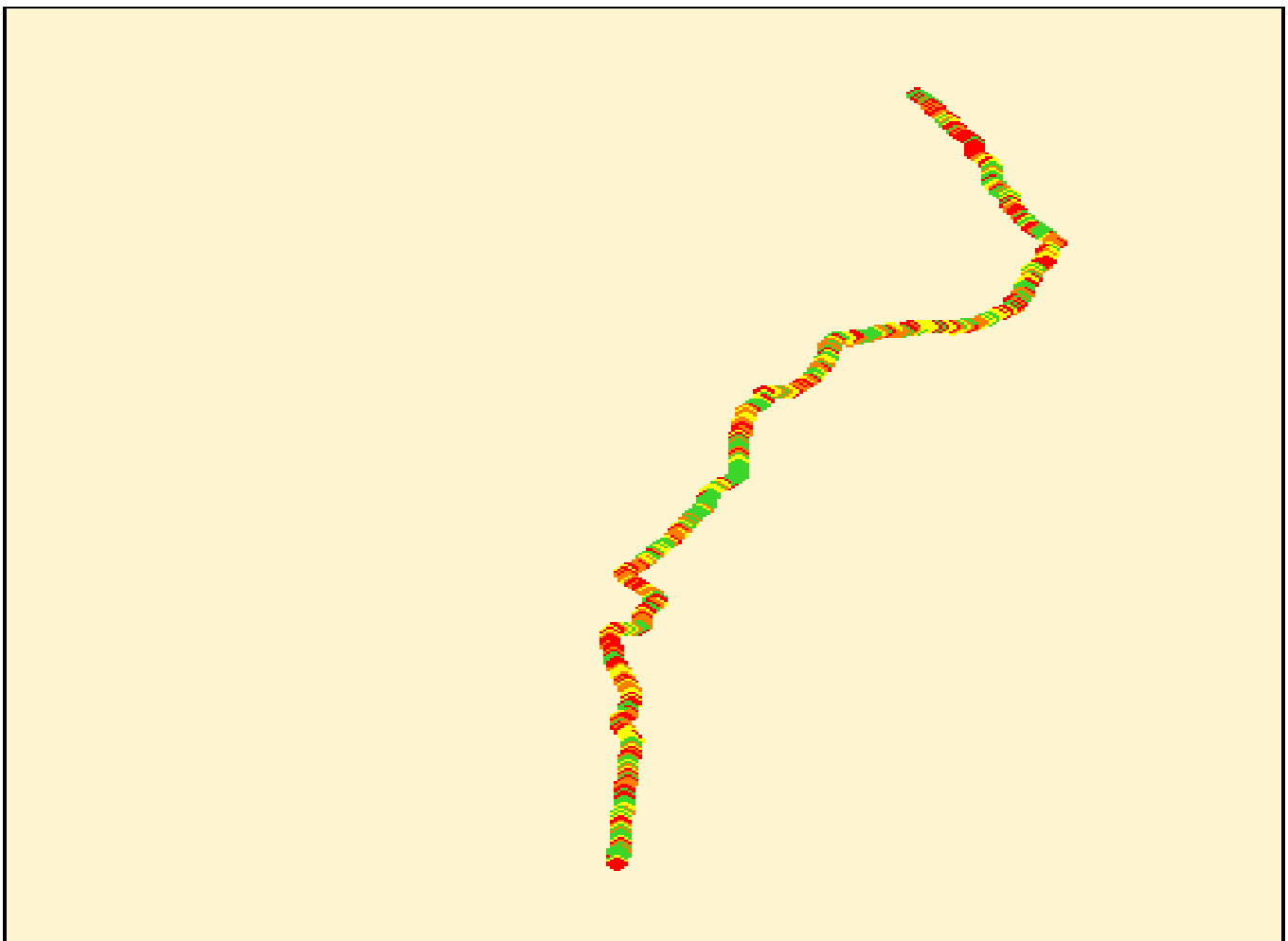
DL throughput	No of Sample	%	Legends
< 2Mbps	4596	22.18%	
2-5 Mbps	5682	27.42$	
5-10 Mbps	4669	22.53%	
>10Mbps	5777	27.88%	

Dynamic Data Test Details

Dynamic Data Test

TSP-VIL

Data Statistics - Dynamic data testing – 210 Kms

Data KPIs - Overall	LTE
Download Throughput (Mbps)	16
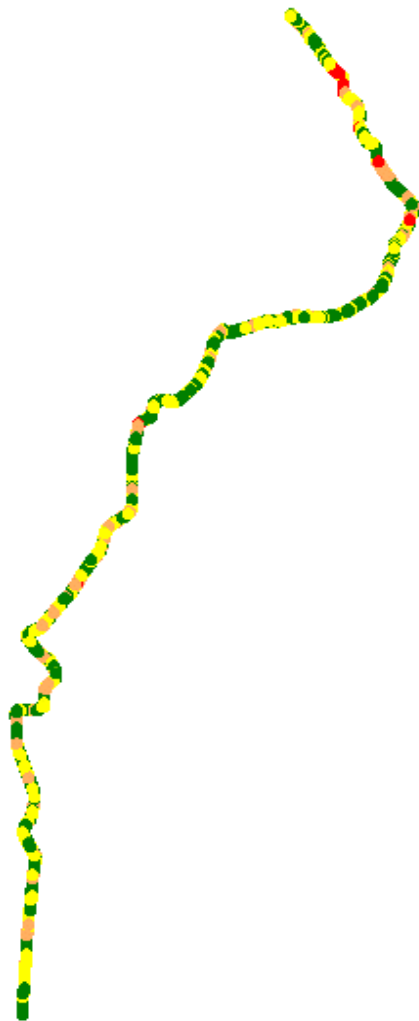
DL throughput	No of Sample	%	Legends
< 2Mbps	342366	12	
2-5 Mbps	300187	10	
5-10 Mbps	396176	13	
>10Mbps	1960459	65	

Dynamic Data Test Details