TRAI

TELECOM REGULATORY AUTHORITY OF INDIA

Regional Office – Bhopal

Operator Assisted Drive Test (OADT)

Bhopal City and Nearby Areas

OADT for Voice - 2nd, 3rd and 4th March 2021

OADT for Data – 5th March 2021

- 2G Network –Airtel, BSNL and VIL
- 3G Network – BSNL and VIL
- VoLTE Network – Airtel, RJio and VIL

Approximate Calls for Voice

- Airtel -1220 (2G-600+VoLTE-620)
- BSNL- 1184 (2G-599+3G-585)
- Jio- VoLTE- 476
- VIL- 1775(2G-595+3G-590+LTE-590)

Route KM Covered for Voice- 325 KM

Hotspots locations for Data Testing

1. MP Nagar Zone 2
2. Habib Ganj Railway Station platform number 1 Side
3. Near GTB Complex New Market
4. Main Railway Station platform number 1 side

Overview

Telecom Regulatory Authority of India has been entrusted with the task of laying down the standards of quality of service to be provided by the service providers and ensuring its enforcement, and also TRAI is responsible for conducting the periodical audit of such services provided by the service providers so as to protect the interest of the consumers of telecommunications service

TRAI is regularly monitoring the performance of Telecom Service Providers (TSP) against the benchmarks for the various Quality of Service (QoS) parameters laid down by the Authority. TSPs submit Performance Monitoring Reports to TRAI every quarter. TRAI also undertakes audit and assessment of Quality of Service to verify the Quality of Service claimed. In view of complaints on call drops and other network quality issues. As per the instructions of TRAI HQ, TRAI Regional Office Bhopal has conducted the drive test with the help of telecom Service Providers of MP from 2nd March 2021 to 5th March 2021 covering various locations in Bhopal City & surrounding area. The performance of Airtel, BSNL, Vodafone Idea Limited (VIL) and Jio were monitored across various technologies (2G, 3G, and 4G). The drive test route was defined on the basis of several factors that include - areas from where call drop complaints are commonly received, areas of heavy usage, residential areas away from arterial roads, office areas, areas where previous Drive tests showed network issues, etc.

Technical Details for drive test in Bhopal:

2G – measurement – UE Locked in 2G

3G – measurement – UE in Dual mode (2G and 3G)

4G – measurement – UE in Free mode

Voice -Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.

Data: Download and Upload Throughputs, Web Browsing Delay, Video Streaming Delay and Latency

Download- 2G - 500KB ,3G - 20 MB, 4G - 40MB

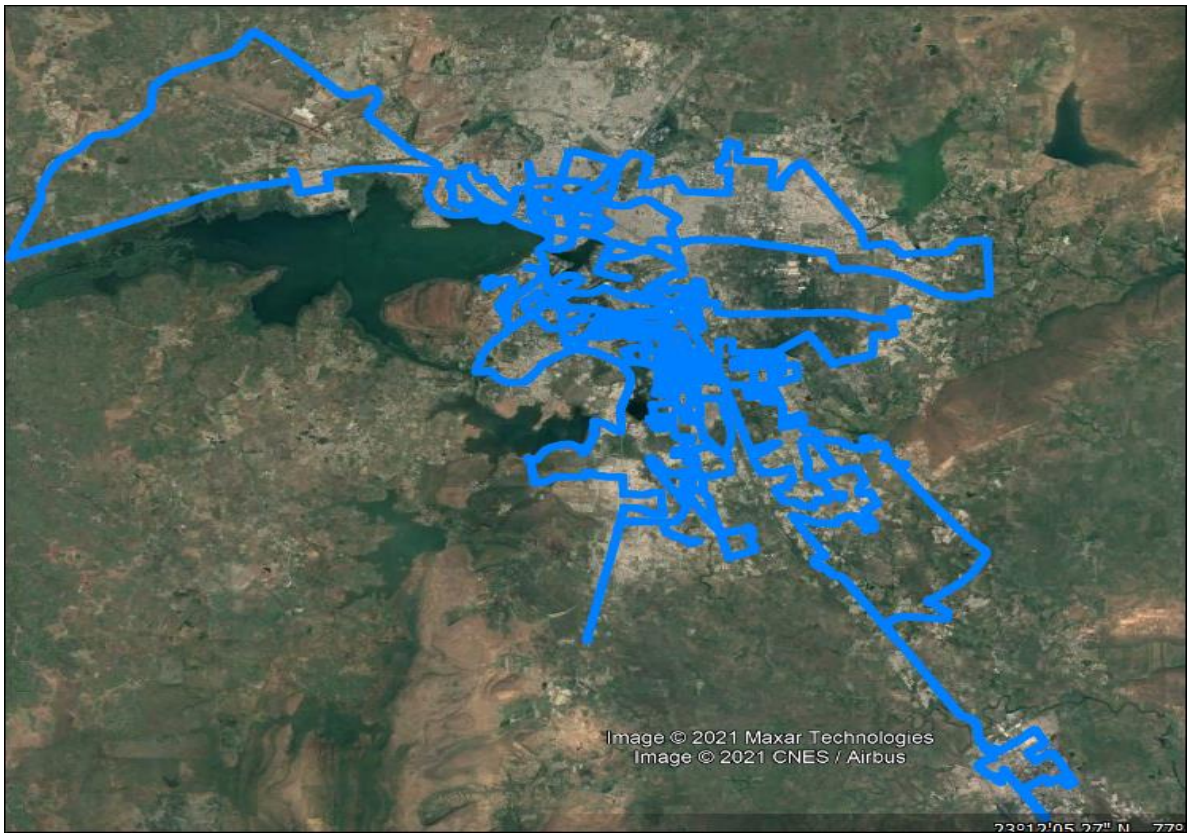
Upload - 2G -100KB ,3G - 5 MB, 4G - 10MB

Web browsing - 3 links of e commerce websites https://www.amazon.in, https://www.flipkart.com, https://paytm.com.

Video Streaming – 130 sec clip (only in 3G and LTE)

Latency – 32 Bytes on www.google.com.

Voice drive test route (Map)



Data testing hotspot locations (Map)

Detailed observations

Key observations of Voice Call

Drop call Rate %(Bench mark < 2%)

TSP	VoLTE Network	3G Network	2G Network
Airtel	0.16	NA	0.17
BSNL	NA	1.57	0.68
JIO	0	NA	NA
VIL	0.00%	0.34%	0.00%

Block call Rate % (Bench mark < 3%)

TSP	VoLTE Network	3G Network	2G Network
Airtel	0	NA	0.67
BSNL	NA	1.53	0.83
JIO	-	NA	NA
VIL	1.19%	0.51%	0.50%

Technology	Parameter	Airtel	BSNL	JIO	VIL
2G	SDCCH Congestion (<=1%)	0.5	0	NA	Not feasible through drive test tool used
	TCH Congestion (<=2%)	0.17	0.83	NA	
3G	CSFB Failure %	-	0	NA	
	SDCCH Congestion %	-	0	NA	
	RRC Congestion %	-	0	NA	
	SDCCH and RRC Congestion % (<=1%)	-	0	NA	
	TCH Congestion %	-	0	NA	
	RAB Congestion %	-	1.53	NA	
	TCH and RAB Congestion % (<=2%)	-	1.53	NA	

Coverage

1. Percentage of Coverage sample of 2G >=- 85 dBm

TSP	Airtel	BSNL	JIO	VIL
Coverage %	96.74	93.81	NA	94.24

2. Percentage of Coverage sample of 3G >= - 90 dBm

TSP	Airtel	BSNL	JIO	VIL
Coverage %	NA	90.84	NA	98.84

3. Percentage of Coverage sample of VoLTE >= -110 dBm

TSP	Airtel	BSNL	JIO	VIL
Coverage %	99.81	NA	99.64	99.95

4. Percentage of time spent on 3G Network

TSP	Airtel	BSNL	JIO	VIL
Time spent %	NA	78.95	NA	82.80

5. Percentage of time spent on VoLTE Network

TSP	Airtel	BSNL	JIO	VIL
Time spent %	100	NA	100	99.93

6. Percentage of RLT >= 48

TSP	Airtel	BSNL	JIO	VIL
Percentage of RLT >=48	0	0	NA	0

7. Average CST in second

TSP	Airtel	BSNL	JIO	VIL
Second in 2G network	4.03	2.10	NA	3.7
Seconds in 3G network	NA	2.18	NA	2.7
Seconds in Volte Network	0.79	NA	1.62	1.5

Voice call summary

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Call attempts	600	599	NA	595
Block call rate %	0.67	0.83	NA	0.50
CSSR %	99.33	97.82	NA	99.50
Drop call rate %	0.17	0.68	NA	0.00
Mobility HOSR %	99.52	96.11	NA	97.19
RX Quality %	96.82	97.25	NA	96.69

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Call attempts	NA	585	NA	590
Block call rate %	NA	1.53	NA	0.51
CSSR %	NA	97.60	NA	99.49
Drop call rate %	NA	1.57	NA	0.34
Mobility HOSR %	NA	95.27	NA	99.92
RX Quality %	NA	96.26	NA	95.42

TSP (For VoLTE)	Airtel	BSNL	JIO	VIL
Call attempts	620	NA	476	590
Block call rate %	0	NA	-	1.19
CSSR %	100	NA	99.16	98.81
Drop call rate %	0.16	NA	0.00	0.00
Mobility HOSR %	100	NA	98.89	99.65
RX Quality %	84.62	NA	87.77	70.24

Data Service Static (on Hotspots)

Hotspot -1 (Location - MP Nagar Zone 2)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	166.7	140	NA	41.98
Upload Throughput in Kbps	56.13	52.1	NA	33.09
Web browsing delay in second	70.78	4.05	NA	38.23
Latency in (msec)	578	174.0	NA	223

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.45	NA	5.14
Upload Throughput in Mbps	NA	1.71	NA	1.15
Video streaming delay in sec	NA	2.93	NA	1.027
Web browsing delay in second	NA	0.27	NA	8.24
Latency in (msec)	NA	104.0	NA	177

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	16.38	NA	14.36	21.37
Upload Throughput in Mbps	4.6	NA	15.51	15.97
Video streaming delay in sec	1.86	NA		0.64
Web browsing delay in second	5.46	NA	2.96	5.75
Latency in (msec)	68.67	NA	69	23

Hotspot -2 (Location - Habib Ganj Railway Station platform number 1 Side)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	216.7	330	NA	223.48
Upload Throughput in Kbps	139.4	92.5	NA	59.79
Web browsing delay in second	28.45	1.33	NA	39.90
Latency in (msec)	467.33	247	NA	80

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	3.806	NA	4.60
Upload Throughput in Mbps	NA	0.848	NA	2.42
Video streaming delay in sec	NA	1.817	NA	0.64
Web browsing delay in second	NA	0.34	NA	6.64
Latency in (msec)	NA	110	NA	36

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	8.46	NA	12.79	36.63
Upload Throughput in Mbps	15.2	NA	11.57	7.65
Video streaming delay in sec	1.77	NA		0.54
Web browsing delay in second	5.32	NA	3.00	5.82
Latency in (msec)	41.65	NA	65	33

Hotspot -3 (Location - Near GTB Complex New Market)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	240.37	410	NA	173.52
Upload Throughput in Kbps	143.67	94.4	NA	104.67
Web browsing delay in second	37.69	1.161	NA	46.38
Latency in (msec)	406	216.0	NA	111

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.253	NA	7.07
Upload Throughput in Mbps	NA	0.561	NA	2.13
Video streaming delay in sec	NA	2.523	NA	0.85
Web browsing delay in second	NA	0.27	NA	6.26
Latency in (msec)	NA	129	NA	39

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	9.82	NA	21.18	32.41
Upload Throughput in Mbps	10.67	NA	16.95	18.94
Video streaming delay in sec	1.88	NA		0.42
Web browsing delay in second	5.75	NA	2.83	5.81
Latency in (msec)	91.33	NA	62	21

Hotspot -4 (Location - Main Railway Station platform number 1 side)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	204	251.6	NA	128.80
Upload Throughput in Kbps	119.93	84.2	NA	102.5
Web browsing delay in second	29.79	1.62	NA	40.24
Latency in (msec)	415	338	NA	76

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.143	NA	4.57
Upload Throughput in Mbps	NA	1.599	NA	2.76
Video streaming delay in sec	NA	1.345	NA	0.71
Web browsing delay in second	NA	0.10	NA	10.42
Latency in (msec)	NA	125.0	NA	61

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	8.59	NA	5.40	16.53
Upload Throughput in Mbps	9.86	NA	5.64	12.22
Video streaming delay in sec	2.06	NA		0.40
Web browsing delay in second	6.82	NA	3.07	5.94
Latency in (msec)	74.33	NA	70	46

Summary Data report static

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	206.94	282.9	NA	141.9
Upload Throughput in Kbps	114.78	80.8	NA	75.01
Web browsing delay in second	41.68	2.04	NA	41.18
Latency in (msec)	466.58	243.7	NA	123

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.663	NA	5.35
Upload Throughput in Mbps	NA	1.179	NA	2.12
Video streaming delay in sec	NA	2.153	NA	0.807
Web browsing delay in second	NA	0.245	NA	7.89
Latency in (msec)	NA	117	NA	79

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	10.81	NA	13.43	26.74
Upload Throughput in Mbps	10.08	NA	12.41	13.7
Video streaming delay in sec	1.89	NA		0.51
Web browsing delay in second	5.84	NA	2.96	5.83
Latency in (msec)	68.96	NA	66	31

Streaming delay

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Average Initial Start Time (Sec)	NA	2.15	NA	0.80
Average Interruption time in Second	NA	17.21	NA	0.00

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Average Initial Start Time (Sec)	1.89	NA		0.51
Average Interruption time in Second	0	NA		0.00

Summary Data report Dynamic

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	5.229	NA	4.2

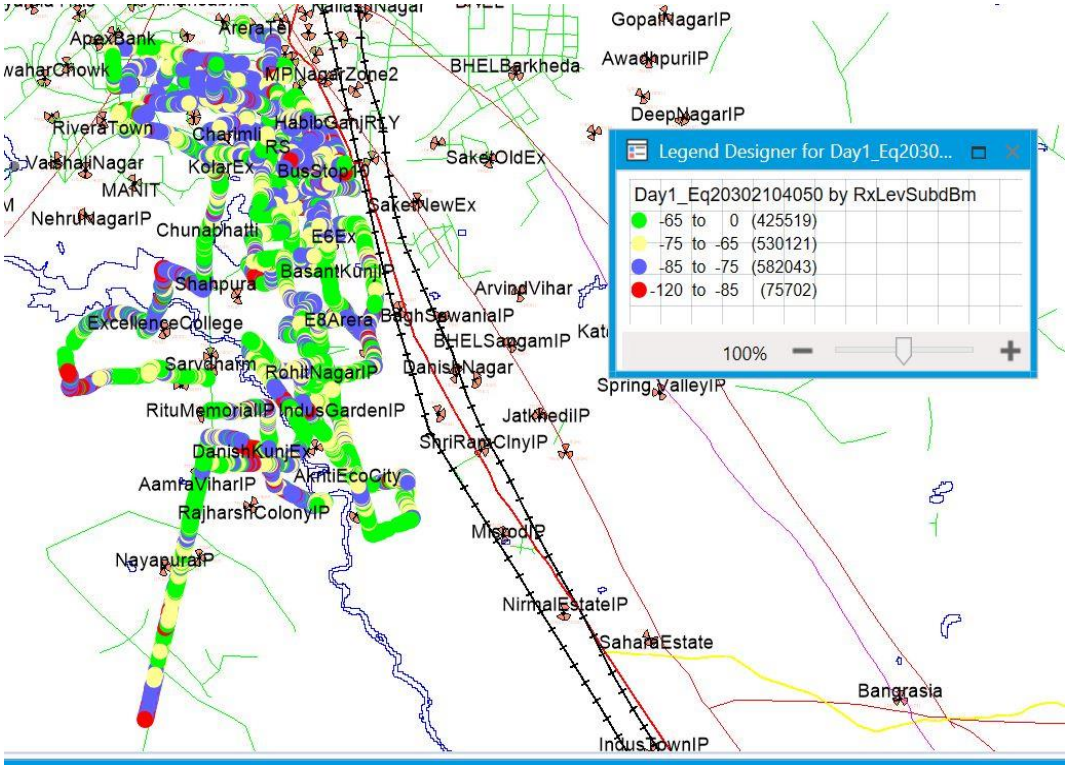
TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	3.85	NA	3.92	16.23

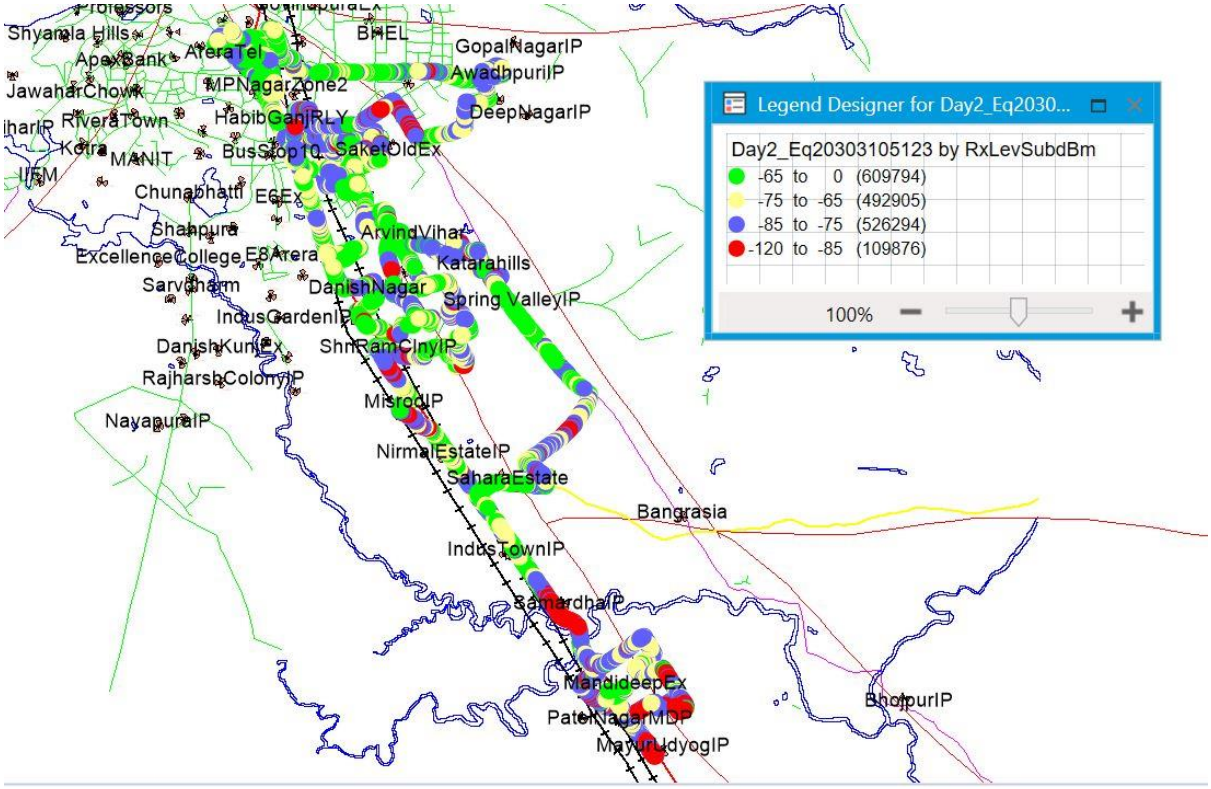
Coverage plots

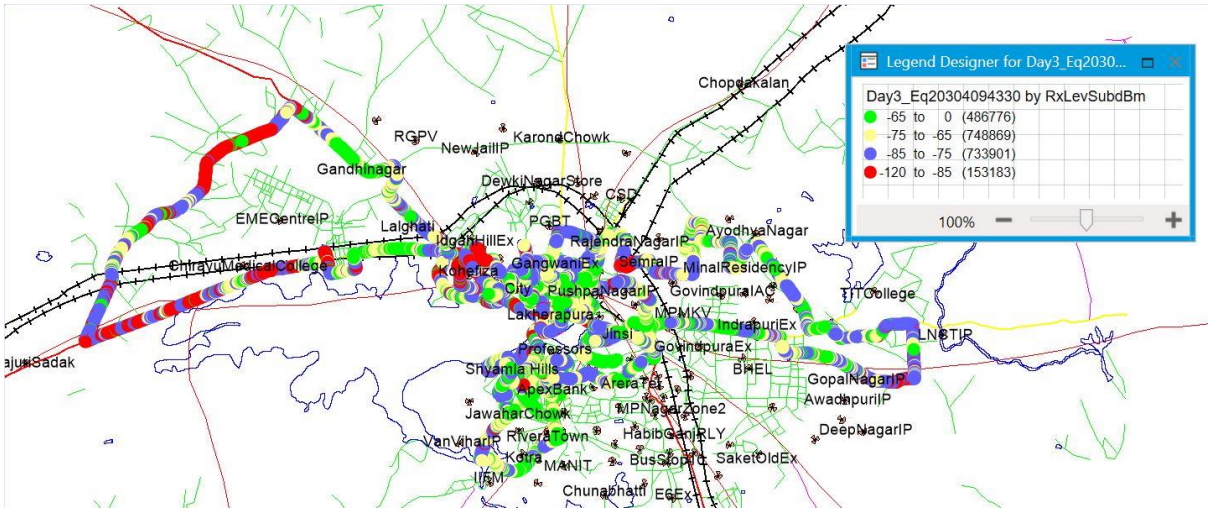
1. 2G

Airtel

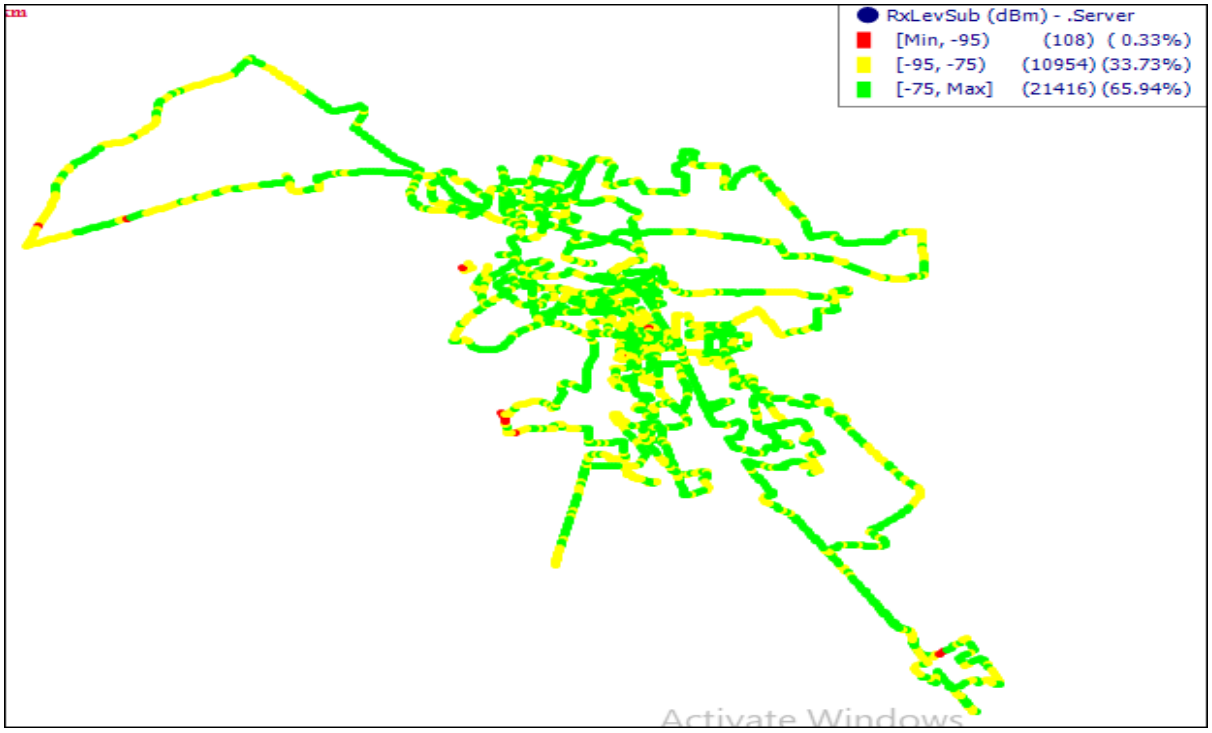
BSNL




Legend Designer for Day2_Eq2030...
Day2_Eq20303105123 by RxLevSubdBm
-65 to 0 (609794)
-75 to -65 (492905)
-85 to -75 (526294)
-120 to -85 (109876)
100%
Professors
Shyamla Hills
ApexBank
AreraTel
BHEL
GopalNagarIP
AwadhpuriIP
JawaharChowk
MPNagarZone2
DeepNagarIP
RiveraTown
HabibGanjRLY
Kotra
MANIT
BusStop10
SaketOldEx
IIFM
Chunabhatti
EGEx
Shahpura
ArvindVihar
Excellence College
EBArera
Katarahills
Sarvdharm
DanishNagar
Spring ValleyIP
IndusGardenIP
DanishKunjEx
ShriRamCityIP
RajharshColonyIP
MisrodIP
NayapuraIP
NirmalEstateIP
SaharaEstate
Bangrasia
IndusTownIP
RamardhaIP
MandideepEx
PatelNagarMDP
MayurUdyogIP
BhojpurIP

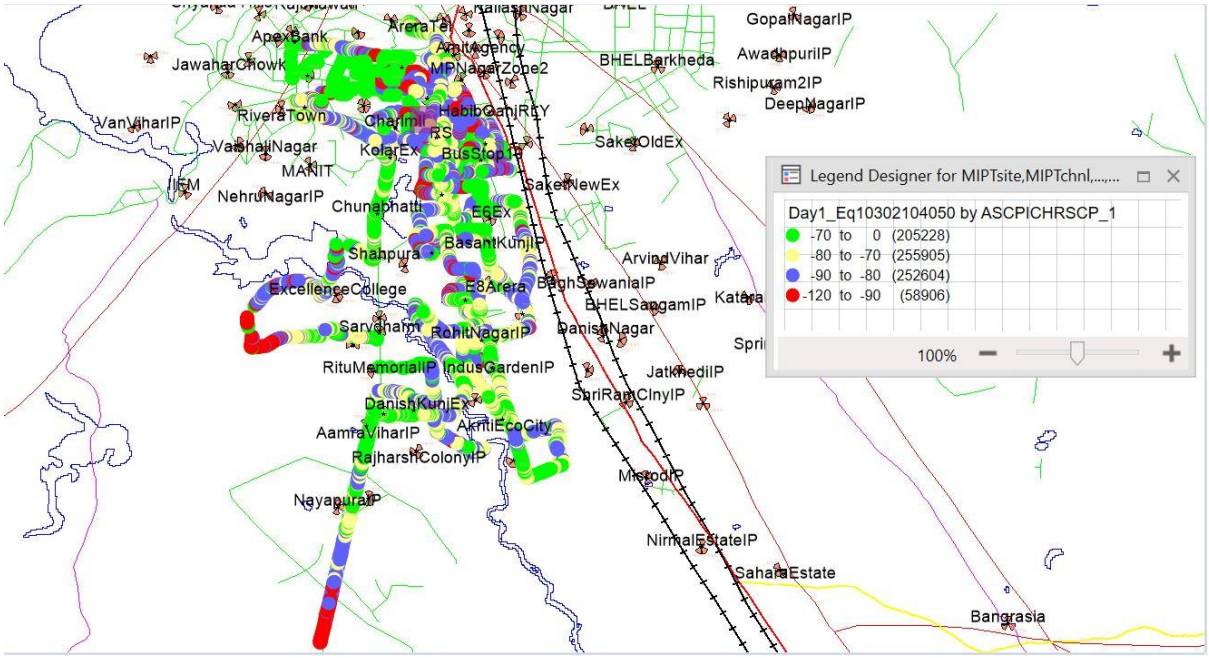

Legend Designer for Day3_Eq2030...
Day3_Eq20304094330 by RxLevSubdBm
-65 to 0 (486776)
-75 to -65 (748869)
-85 to -75 (733901)
-120 to -85 (153183)
100%
Chopdakalan
RGPV
NewJailIP
KarondChowk
GandhiNagar
DewkiNagarStore
CSD
EMECentreIP
Lalghati
PGBT
AyodhyaNagar
IdgahHillEx
RajendraNagarIP
ChirayuMedicalCollege
GangwaniEx
CentralP
MinalResidencyIP
Koneriza
City
PushpaNagarIP
GovindpuraIAC
IITCollege
Lakherapura
MPMKV
IndrapuriEx
Jinsi
LNCTIP
Professors
GovindpuraEx
ajuriSadak
Shyamla Hills
BHEL
ApexBank
AreraTel
GopalNagarIP
AwadhpuriIP
MPNagarZone2
JawaharChowk
DeepNagarIP
VanViharIP
RiveraTown
HabibGanjRLY
Kotra
MANIT
BusStop10
SaketOldEx
IIFM
Chunabhatti
EGEx

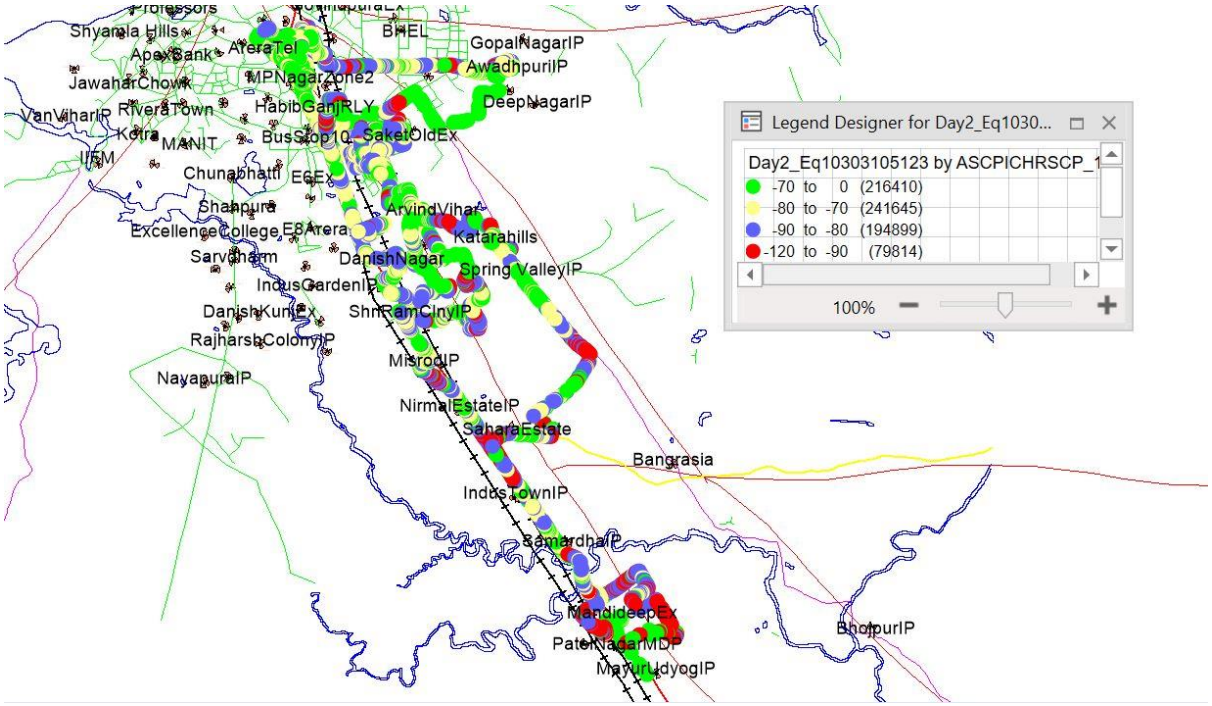
VIL

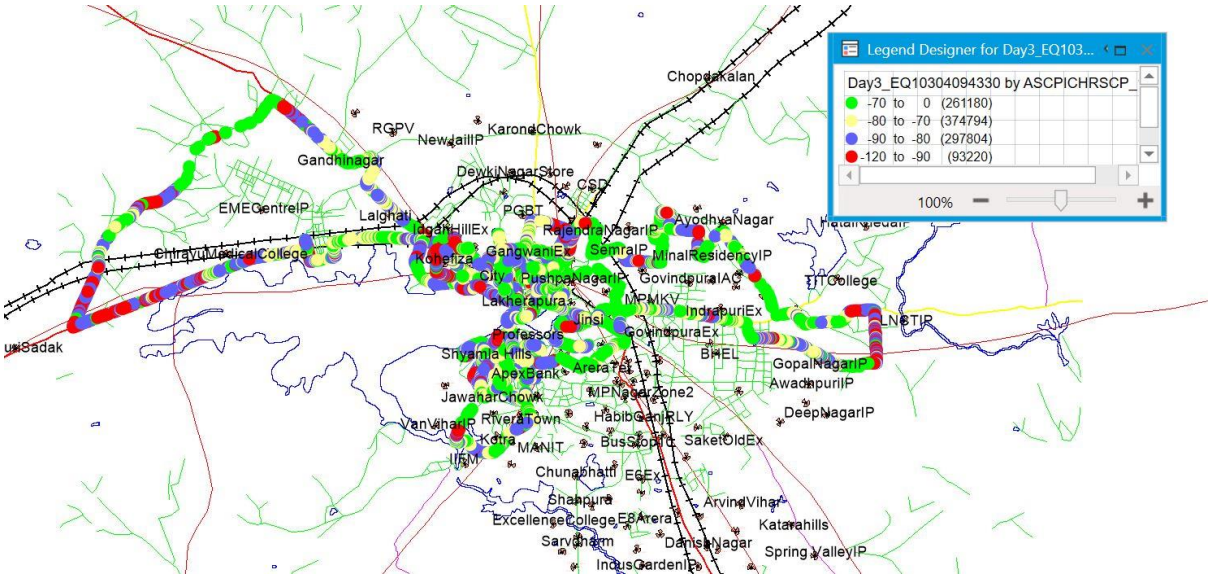


2. 2G/3G dual

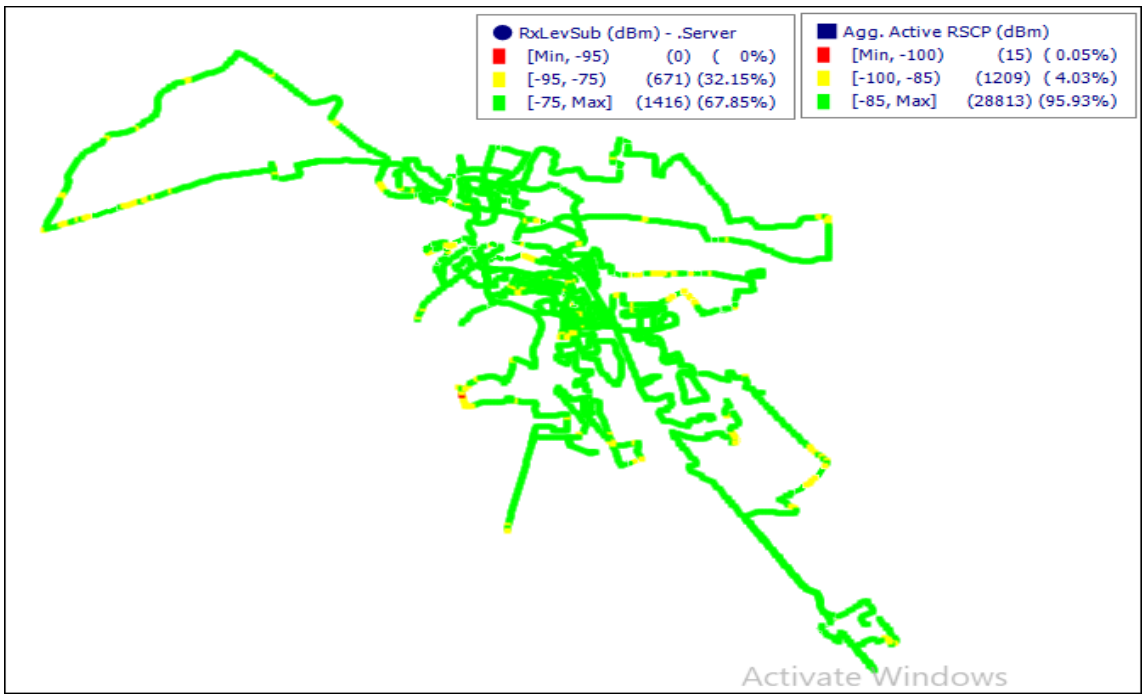
BSNL




Legend Designer for Day2_Eq1030...
Day2_Eq10303105123 by ASCPICHRSCP_1
-70 to 0 (216410)
-80 to -70 (241645)
-90 to -80 (194899)
-120 to -90 (79814)
100%
Professors
Shyamla Hills
BHEL
GopalNagarIP
ApexBank
AreraTel
AwadhpuriIP
JawaharChowk
MPNagarZone2
DeepNagarIP
VanViharIP
RiveraTown
HabibGanjRLY
Kotra
MANIT
BusStop10
SaketOldEx
IISM
Chunabhatti
EGEx
Shahpura
ArvindVihar
ExcellenceCollege
E8Arera
Katarahills
Sarvdharm
DanishNagar
Spring ValleyIP
IndusGardenIP
DanishKunjEx
ShriRamCityIP
RajharshColonyIP
MisrodIP
NayapuraIP
NirmalEstateIP
SaharaEstate
Bangrasia
IndusTownIP
Samardhair
MandideepEx
BhopurIP
PatelNagarMDP
MayurUdyogIP


Legend Designer for Day3_EQ103...
Day3_EQ10304094330 by ASCPICHRSCP_
-70 to 0 (261180)
-80 to -70 (374794)
-90 to -80 (297804)
-120 to -90 (93220)
100%
Chopdakalan
RGPV
NewJailIP
KarondChowk
Gandhinagar
DewkiNagarStore
CSD
EMECentreIP
Lalghati
PGBT
AyodhyaNagar
IdgahHillEx
RajendraNagarIP
ChiravuMedicalCollege
Rohefiza
GangwaniEx
SemraIP
MinalResidencyIP
City
PushpaNagarIP
GovindpuraIAC
ITCollege
Lakherapura
MPMKV
Jinsi
IndrapuriEx
LNCTIP
GovindpuraEx
Professors
Shyamla Hills
BHEL
ApexBank
AreraTel
GopalNagarIP
AwadhpuriIP
JawaharChowk
MPNagarZone2
DeepNagarIP
VanViharIP
RiveraTown
HabibGanjRLY
Kotra
MANIT
BusStop10
SaketOldEx
IISM
Chunabhatti
EGEx
Shahpura
ArvindVihar
ExcellenceCollege
E8Arera
Katarahills
Sarvdharm
DanishNagar
Spring ValleyIP
IndusGardenIP

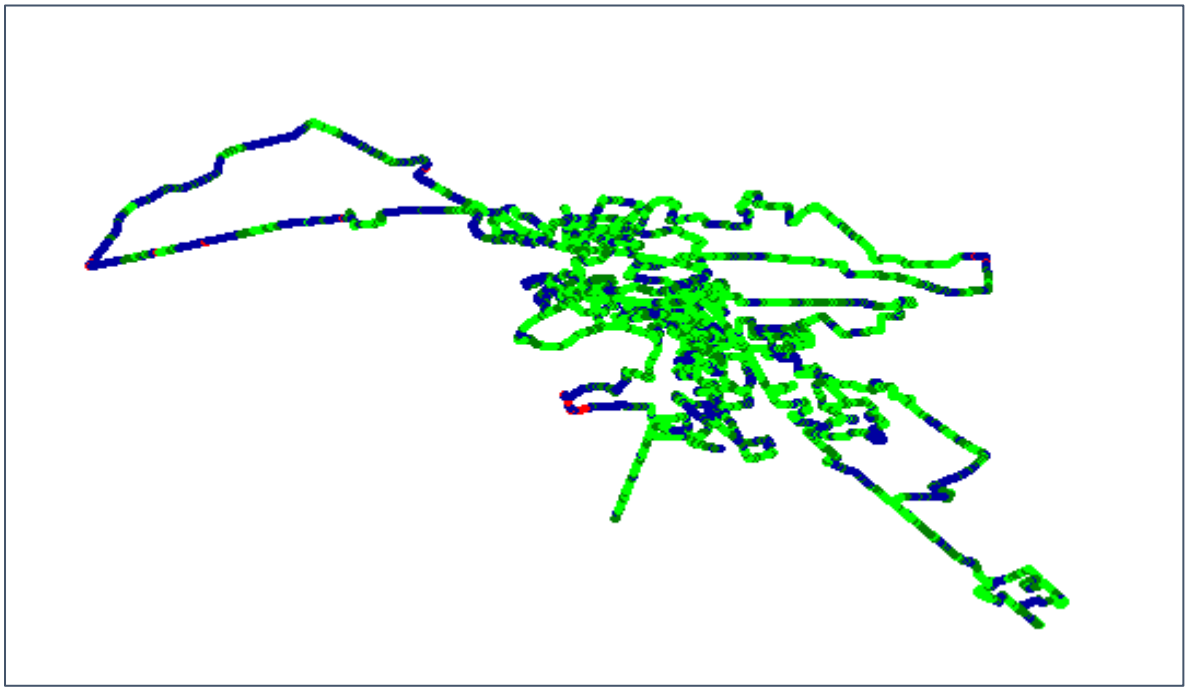
VIL



3. **VoLTE (Free)**

Airtel

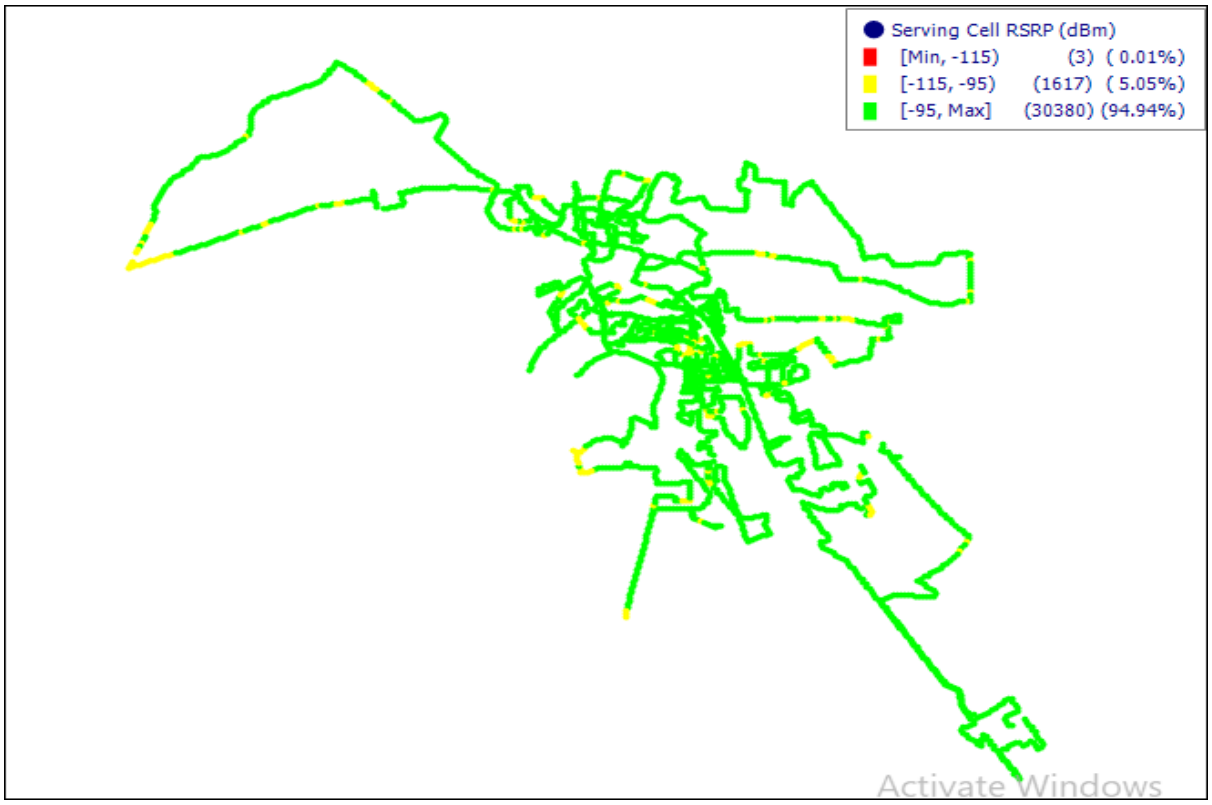
JIO



Serving Cell Serving RSRP RSRP[dBm]

-80 <= x < -40 (49.24%, 29208)
-90 <= x < -80 (28.35%, 16815)
-110 <= x < -90 (22.05%, 13079)
-140 <= x < -110 (0.36%, 213)

VIL

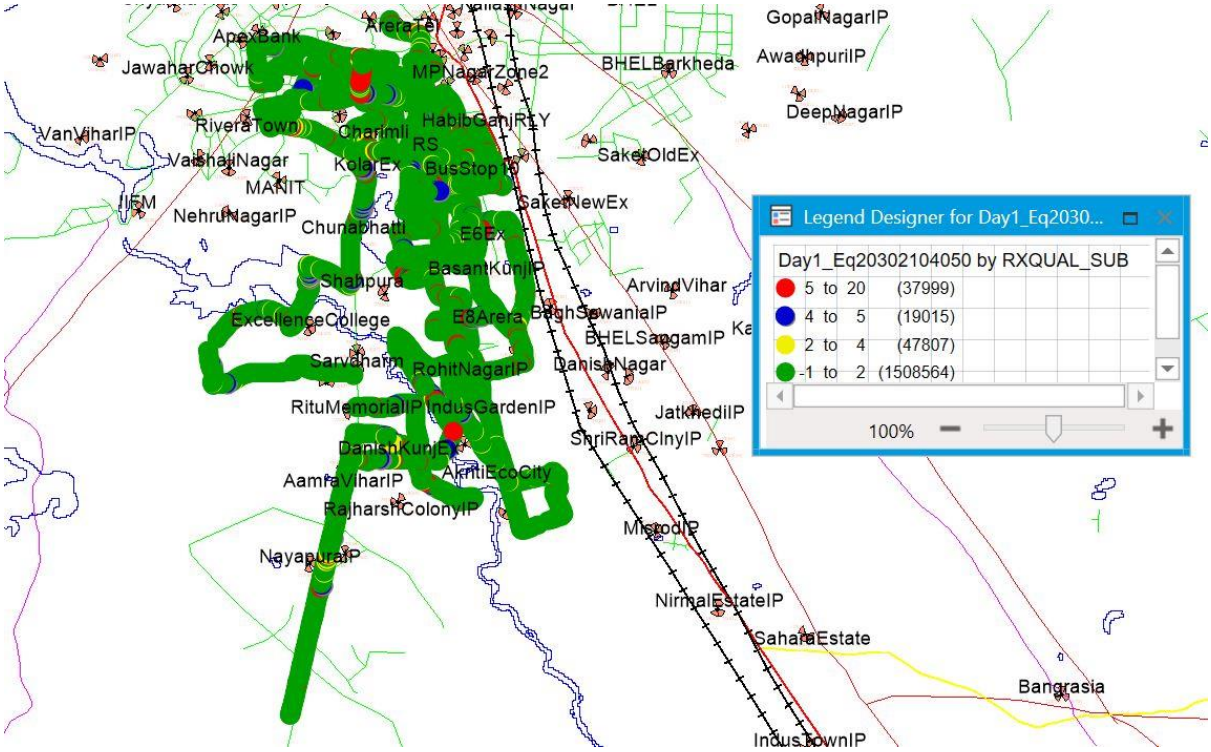


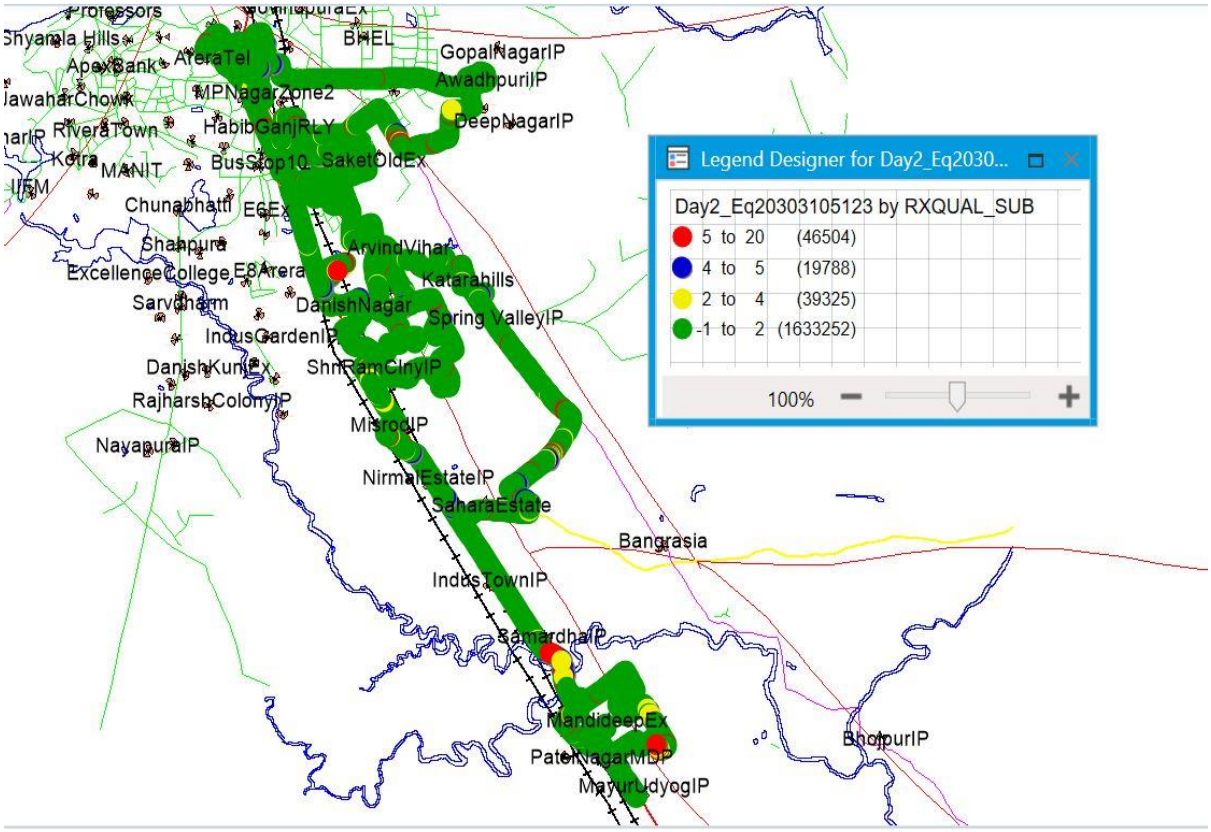
Quality plots

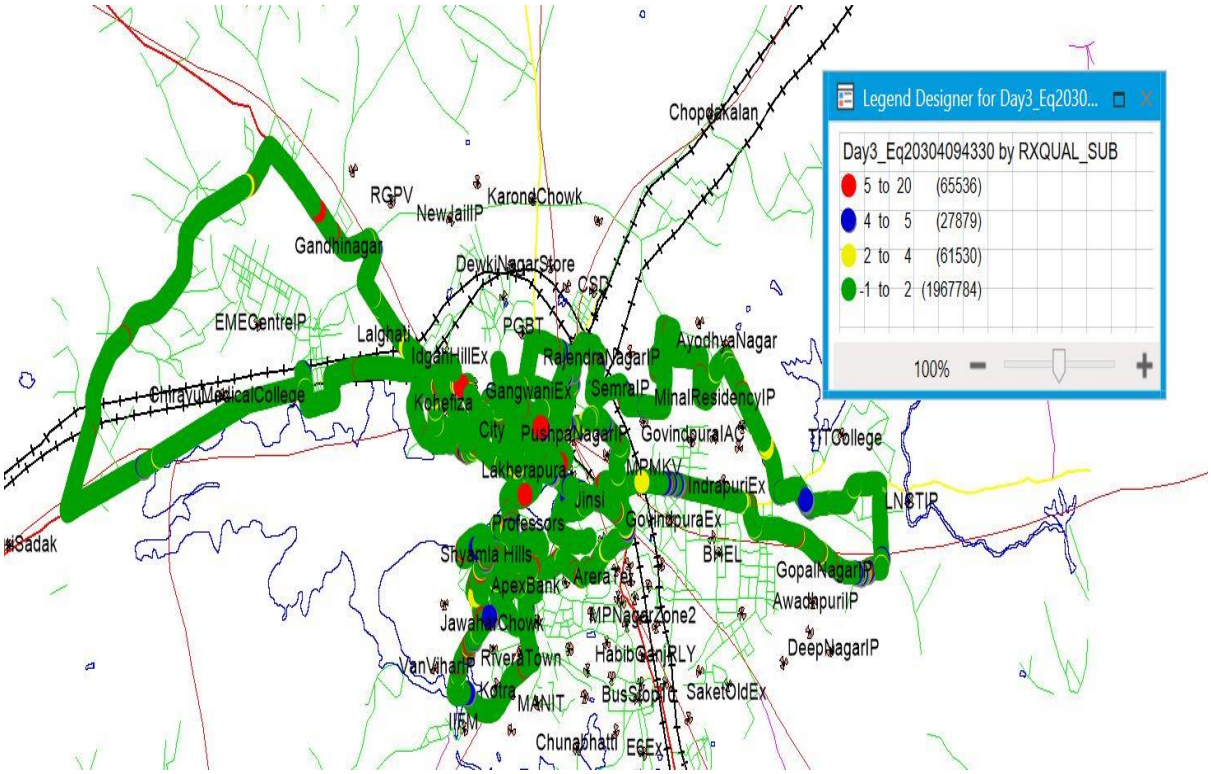
1. **2G**

Airtel

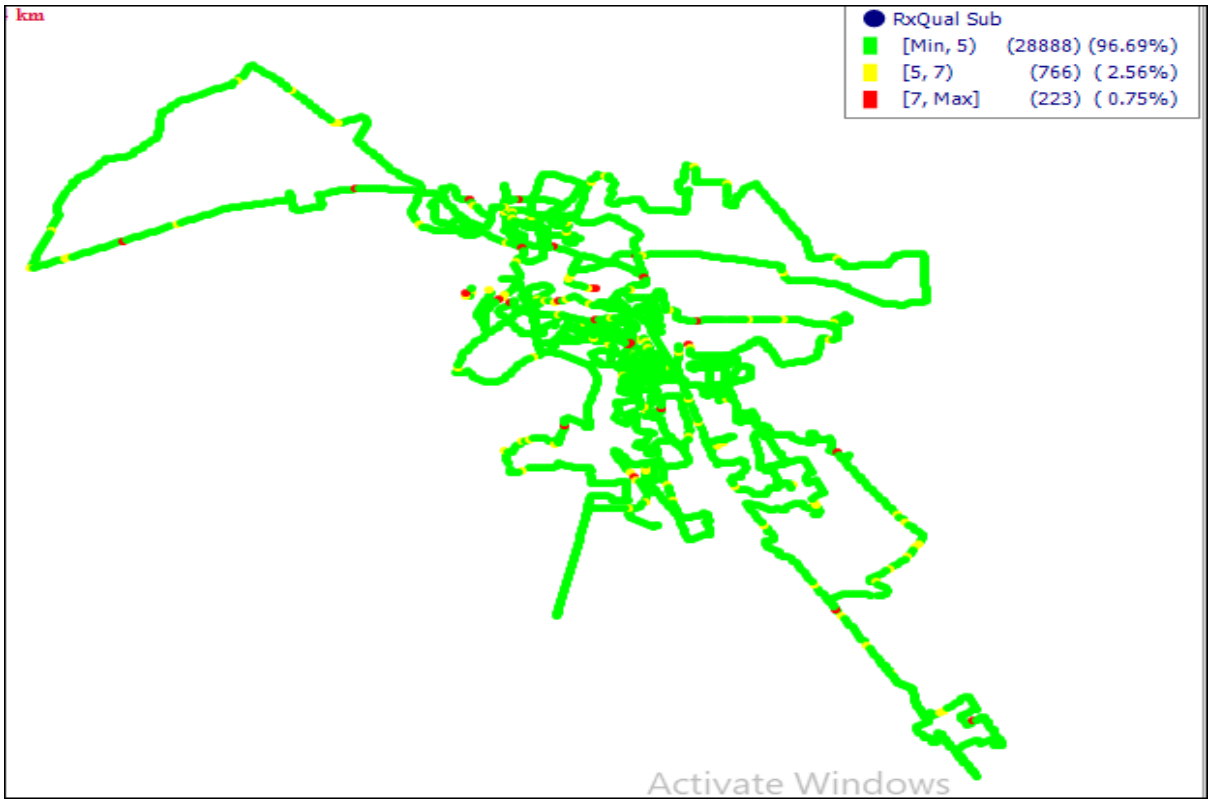
BSNL




Legend Designer for Day2_Eq2030...
Day2_Eq20303105123 by RXQUAL_SUB
5 to 20 (46504)
4 to 5 (19788)
2 to 4 (39325)
-1 to 2 (1633252)
100%
BHEL
GopalNagarIP
AwadhpuriIP
DeepNagarIP
HabibGanjRLY
SaketOldEx
MANIT
BusStop10
EGEx
ArvindVihar
KatarahillsIP
DanishNagar
Spring ValleyIP
ShriRamCityIP
MisrodIP
NirmalEstateIP
SaharaEstate
Bangrasia
IndusTownIP
BhopurIP
MayurUdyogIP

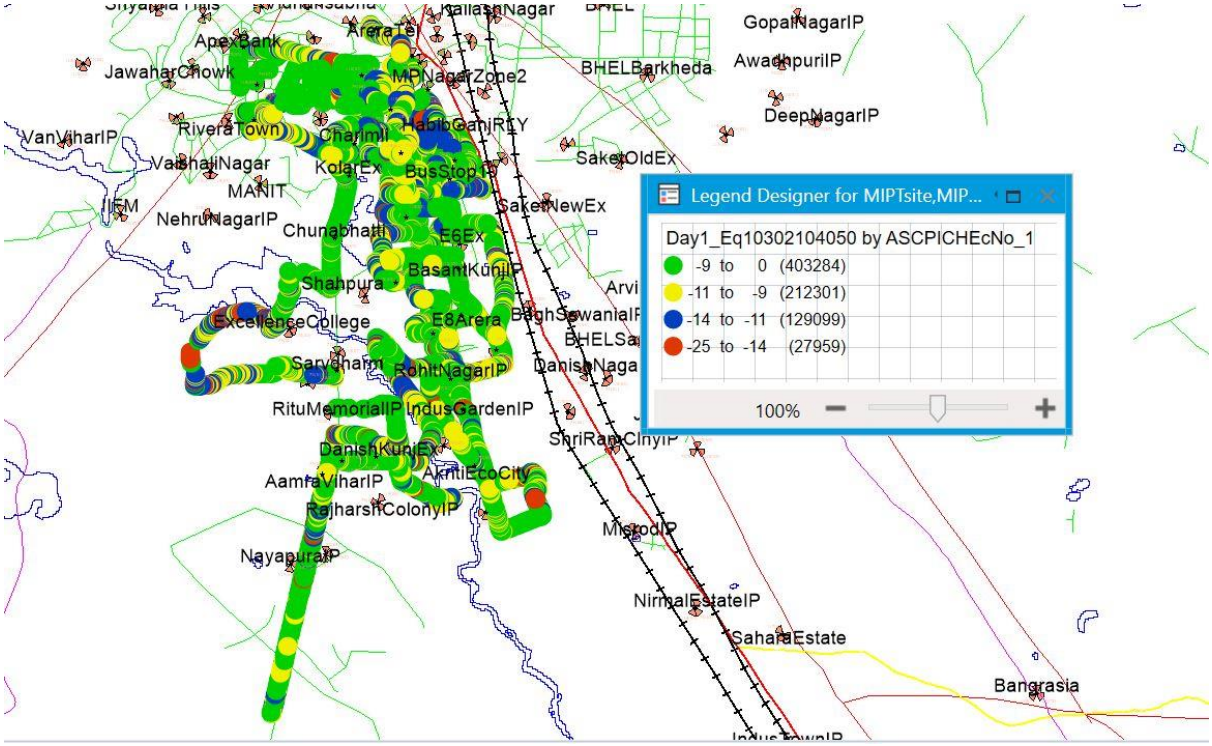

Legend Designer for Day3_Eq2030...
Day3_Eq20304094330 by RXQUAL_SUB
5 to 20 (65536)
4 to 5 (27879)
2 to 4 (61530)
-1 to 2 (1967784)
100%
Chopdakalan
RGPV
KarondChowk
NewJailIP
Gandhinagar
DewkiNagarStore
CSD
EMECentreIP
PGBT
AyodhyaNagar
IdgahHillEx
RajendraNagarIP
ChiravuMedicalCollege
GangwaniEx
SemriIP
MinalResidencyIP
City
PushpaNagarIP
GovindpuraIAC
ITCollege
Lakherapura
MPMKV
IndrapuriEx
Jinsi
GovindpuraEx
Professors
BHEL
GopalNagarIP
AwadhpuriIP
DeepNagarIP
HabibGanjRLY
SaketOldEx
MANIT
BusStop10
EGEx

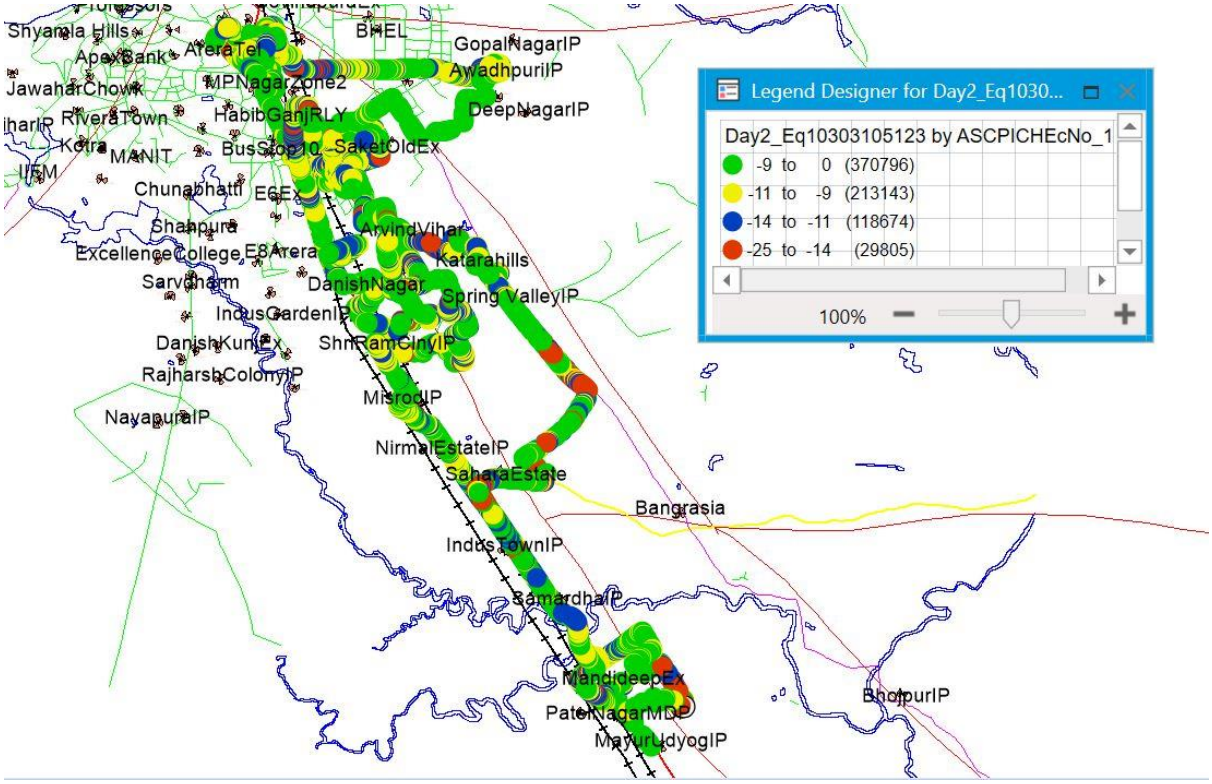
VIL

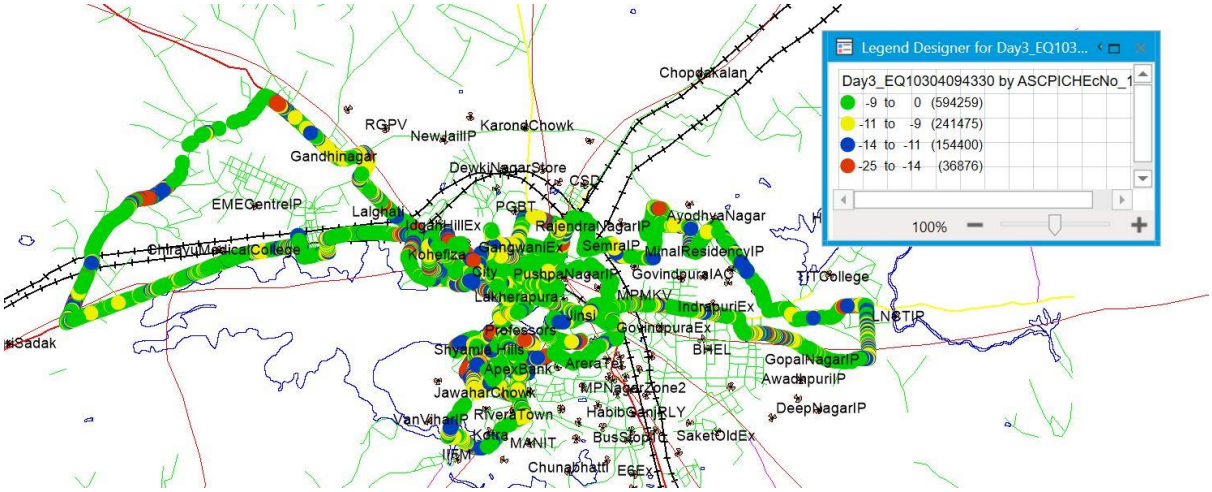


2. 2G/3G dual

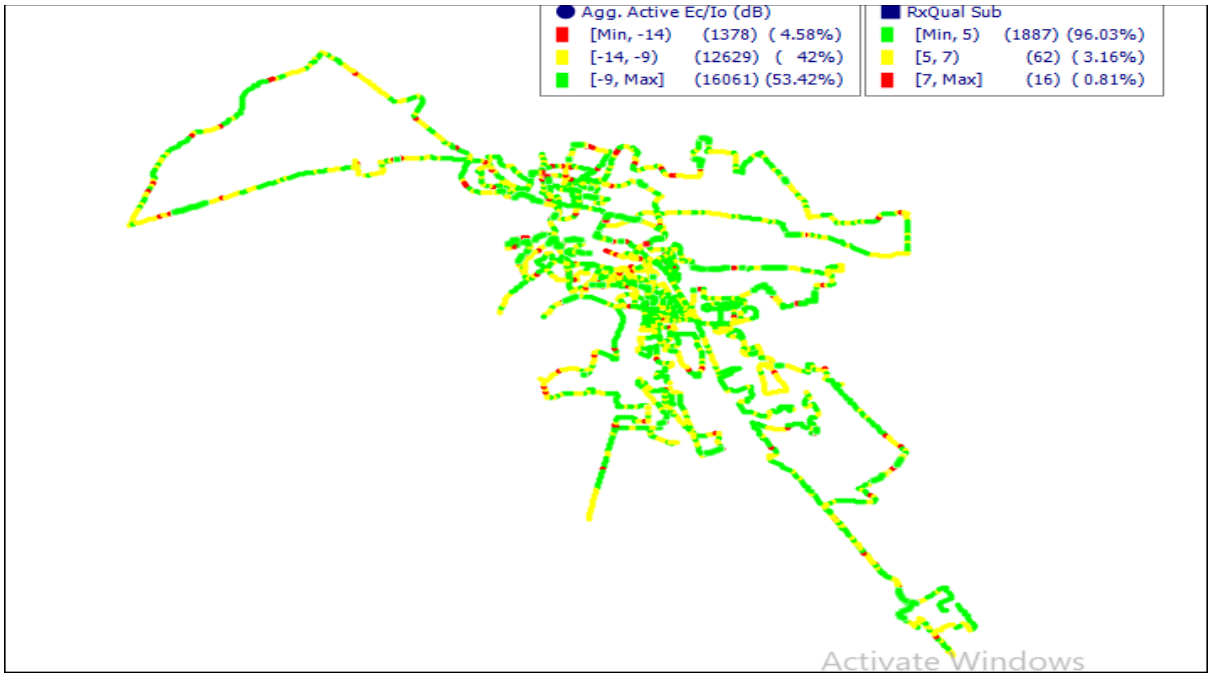
BSNL




Legend Designer for Day2_Eq1030...
Day2_Eq10303105123 by ASCPICHEcNo_1
-9 to 0 (370796)
-11 to -9 (213143)
-14 to -11 (118674)
-25 to -14 (29805)
100%
Shyamla Hills
ApexBank
AreraTel
BHEL
GopalNagarIP
AwadhpuriIP
JawaharChowk
MPNagarZone2
DeepNagarIP
RiveraTown
HabibGanjRLY
Kotra
MANIT
BusStop10
SaketOldEx
IIFM
Chunabhatti
E6Ex
Shahpura
ArvindVihar
ExcellenceCollege
E8Arera
Katarahills
Sarvdharm
DanishNagar
Spring ValleyIP
IndusGardenIP
DanishKunjEx
ShriRamCinyIP
RajharshColonyIP
MisrodIP
NayapuraIP
NirmalEstateIP
SaharaEstate
Bangrasia
IndusTownIP
SamardhaIP
MandideepEx
BhojpurIP
PatelNagarMDP
MayurUdyogIP

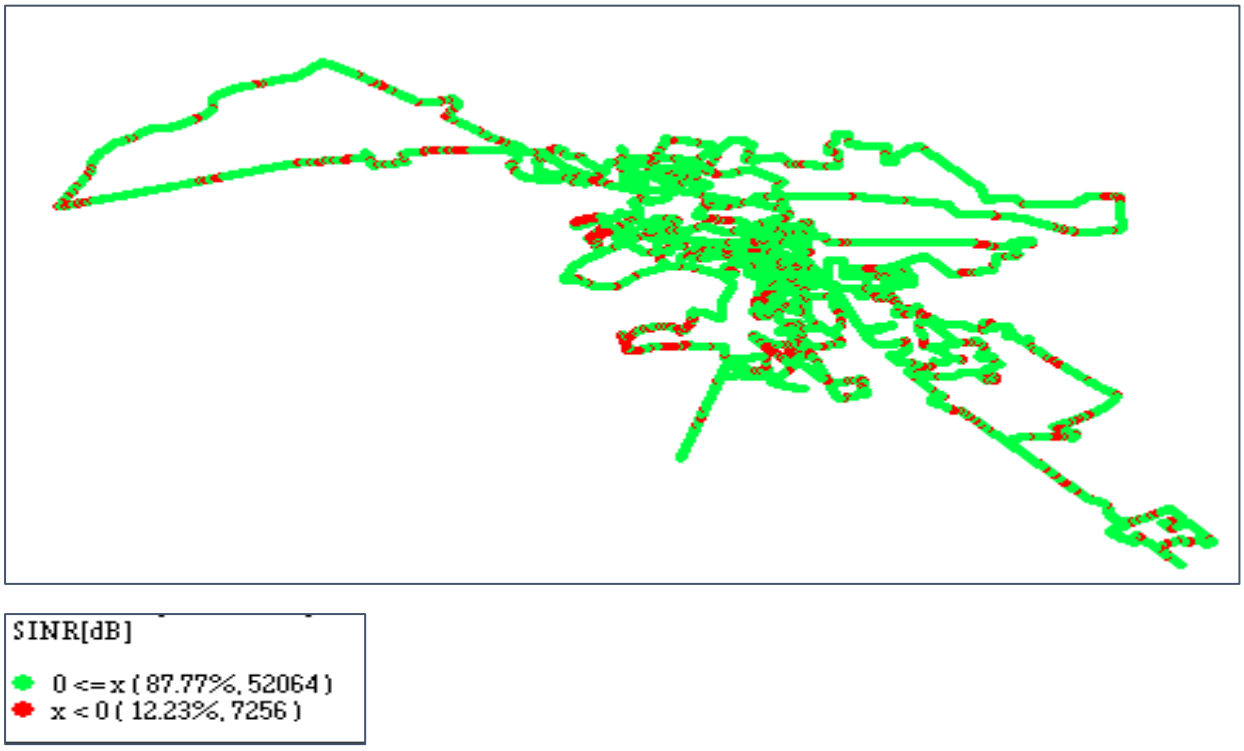

Legend Designer for Day3_EQ103...
Day3_EQ10304094330 by ASCPICHEcNo_1
-9 to 0 (594259)
-11 to -9 (241475)
-14 to -11 (154400)
-25 to -14 (36876)
100%
Chopdakalan
RGPV
NewJailIP
KarondChowk
Gandhinagar
DewkiNagarStore
CSD
EMECentreIP
Lalghati
PGBT
AyodhyaNagar
IdgahHillEx
RajendraNagarIP
ChirayuMedicalCollege
Kohefiza
GangwaniEx
SemraIP
MinalResidencyIP
City
PushpaNagarIP
GovindpuraIAC
TITCollege
Lakherapura
MPMKV
IndrapuriEx
Jinsi
LNCTIP
Professors
GovindpuraEx
Shyamla Hills
BHEL
GopalNagarIP
ApexBank
AreraTel
AwadhpuriIP
JawaharChowk
MPNagarZone2
DeepNagarIP
VanViharIP
RiveraTown
HabibGanjRLY
Kotra
MANIT
BusStop10
SaketOldEx
IIFM
Chunabhatti
E6Ex

VIL

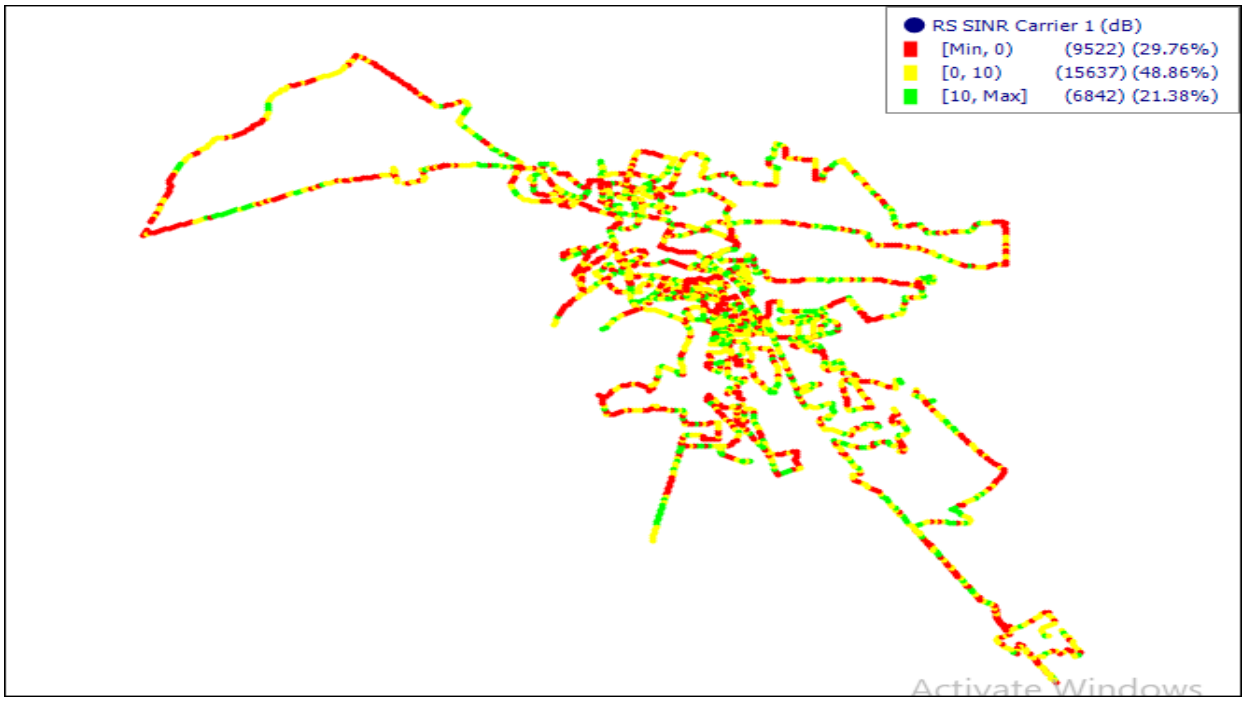


3. **VoLTE (Free)**

JIO



VIL

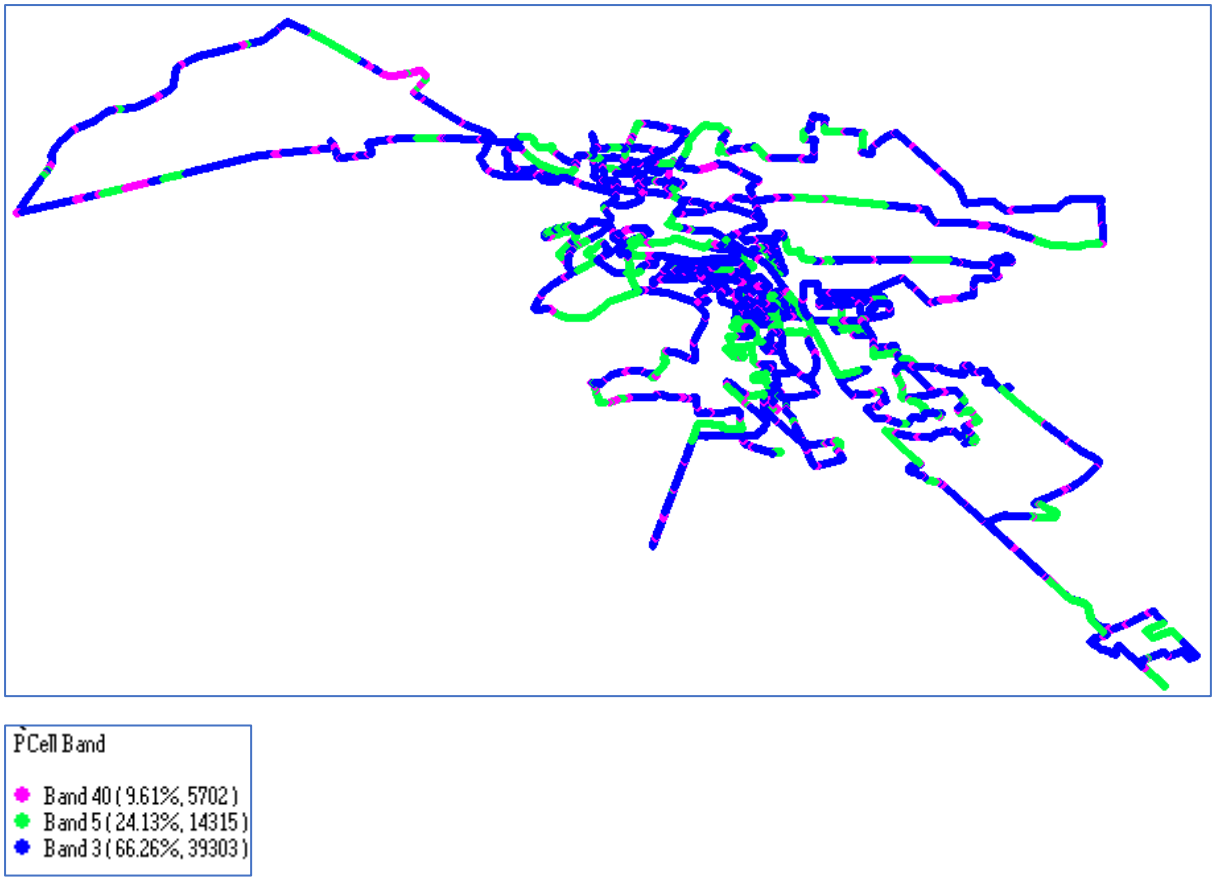


Technological distribution MAP

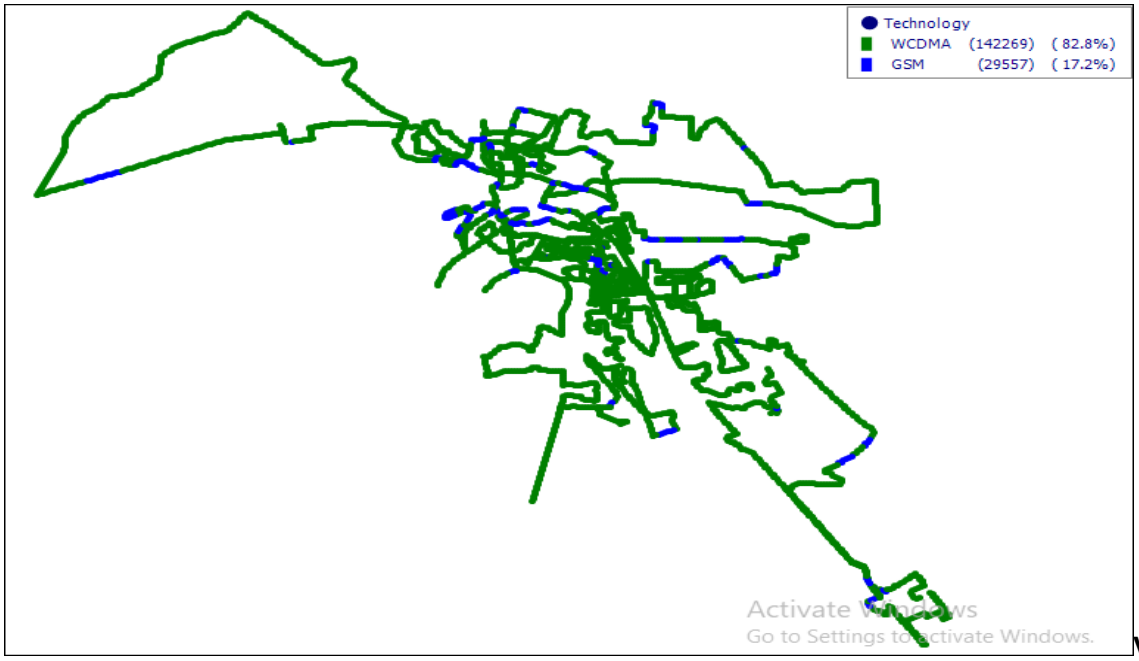
BSNL-2G

BSNL-3G

JIO VoLTE

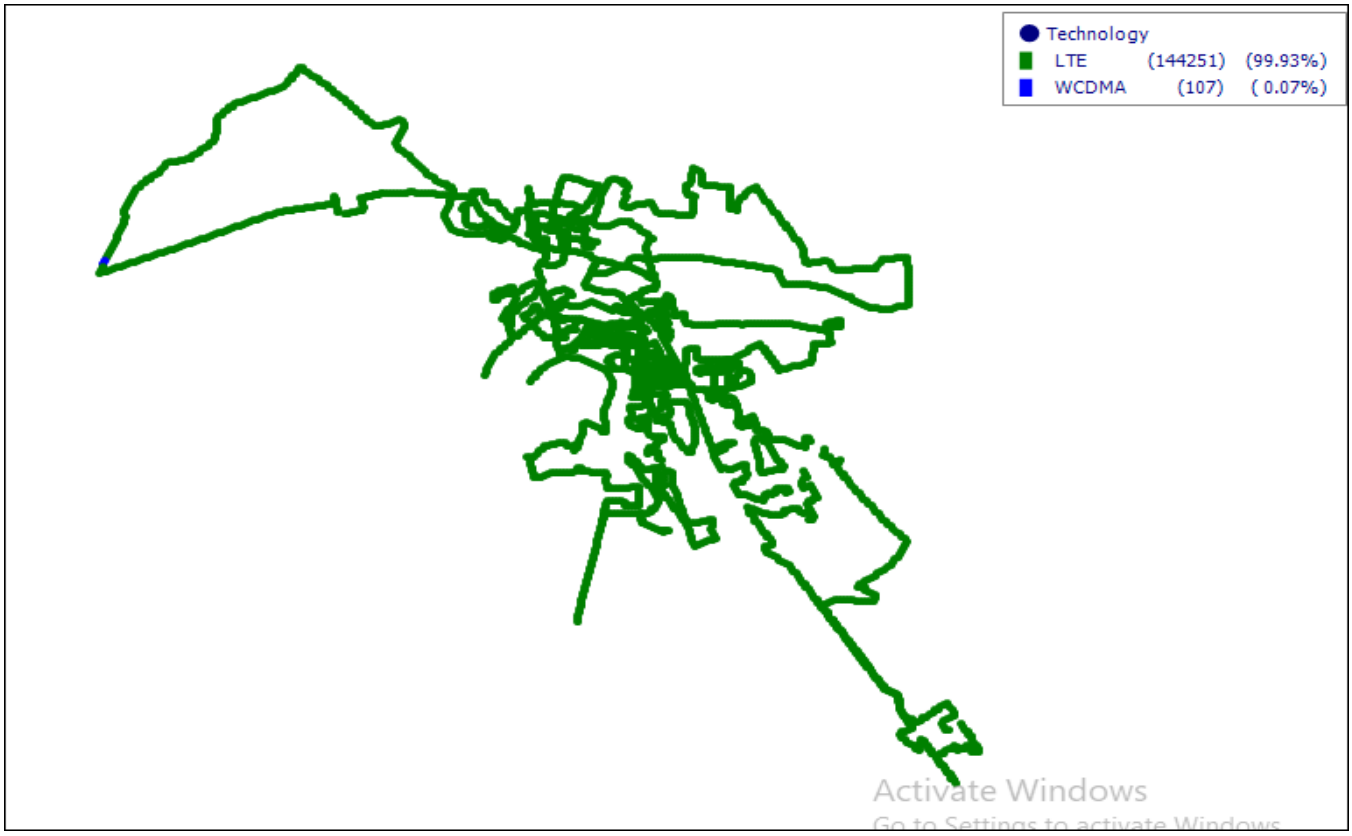


VIL -3G



VIL-

VIL-Volte



Data speed testing by “traimyspeed” app

Hotspot		Airtel	BSNL	RJio	VIL
MP Nagar Zone 2	2G download in Mbps	0.21	0.14	NA	0.24
	2G upload in Mbps	0.09	0.13	NA	0.25
	3G download in Mbps	NA	2.67	NA	6.77
	3G upload in Mbps	NA	1.78	NA	3.5
	4G download in Mbps	13.96	NA	39.48	16.37
	4G upload in Mbps	5.42	NA	44.47	15.58
Habib Ganj Railway station PF 1	2G download in Mbps	0.22	0.33	NA	0.25
	2G upload in Mbps	0.15	0.24	NA	0.17
	3G download in Mbps	NA	2.24	NA	3.84
	3G upload in Mbps	NA	1.61	NA	4.69
	4G download in Mbps	14.64	NA	21.04	12.97
	4G upload in Mbps	16.41	NA	20.81	5.57
GTB Complex New Market	2G download in Mbps	0.27	0.41	NA	0.27
	2G upload in Mbps	0.15	0.22	NA	0.24
	3G download in Mbps	NA	2.1	NA	4.35
	3G upload in Mbps	NA	0.92	NA	3.85
	4G download in Mbps	12.48	NA	13.34	15.44
	4G upload in Mbps	11.16	NA	19.91	6.84
Main Railway station PF 1	2G download in Mbps	0.09	0.41	NA	0.2
	2G upload in Mbps	0.09	0.2	NA	0.19
	3G download in Mbps	NA	2.25	NA	4.45
	3G upload in Mbps	NA	2.54	NA	2.57
	4G download in Mbps	10.95	NA	12.74	11
	4G upload in Mbps	8.21	NA	5.93	28.54