Report on Mobile Quality of Service in Thimphu Thromde

Bhutan InfoComm and Media Authority

Royal Government of Bhutan

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A. Background

The network QoS monitoring was carried out in the month of October and November, 2022 in different parts of Thimphu Thromde to obtain the precise QoS data. The areas were divided into smaller and separate areas to obtain more accuracy.

The monitoring was carried out during the peak hours (between 6PM to 9PM) of the day.

Sl. No	Name of the places
1.	Bebena
2.	BPC colony Simtokha
3.	Changjalu
4.	Hejo
5.	Jungshina
6.	Olakha Workshop
7.	Around White Tara Hotel (Old BICMA office area)
8.	RIM
9.	Simtokha Dzong
10.	Bhutan Kitchen and Village Restaurant Babesa
11.	Dr.Tobgay school area Babesa
12.	Old Highway Babesa
13.	Zimdra (Below Highway Babesa)
14.	Lower Pamtsho
15.	Upper Pamtsho 1
16.	Upper Pamtsho 2
17.	Lower Taba
18.	Upper Taba
19.	YHSS area
20.	Lower Town

21.	Upper Town
22.	Vegetable Market
23.	Kaja Throm
24.	Changbangdu
25.	Changzamtog
26.	NPPF colony
27.	Changangkha (Housing, CMSS and RKPS)
28.	Lower Motithang
29.	Ministers' Colony (including the road above MHSS)
30.	MoIC (including ministry areas, BTL and Kawajangsa)
31.	Sangaygang (RITH, Motithang Takin Preserve)
32.	Upper Motithang
33.	Zilukha - Motithang Highway

B. Results

The findings of the drive test of operators are as shown below:

1. Bebena area

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.89	6.12	No issue
TICL	0	3.84	8.81	No issue

● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	10.44	17.96	No issue
TICL	19.73	11.55	No issue
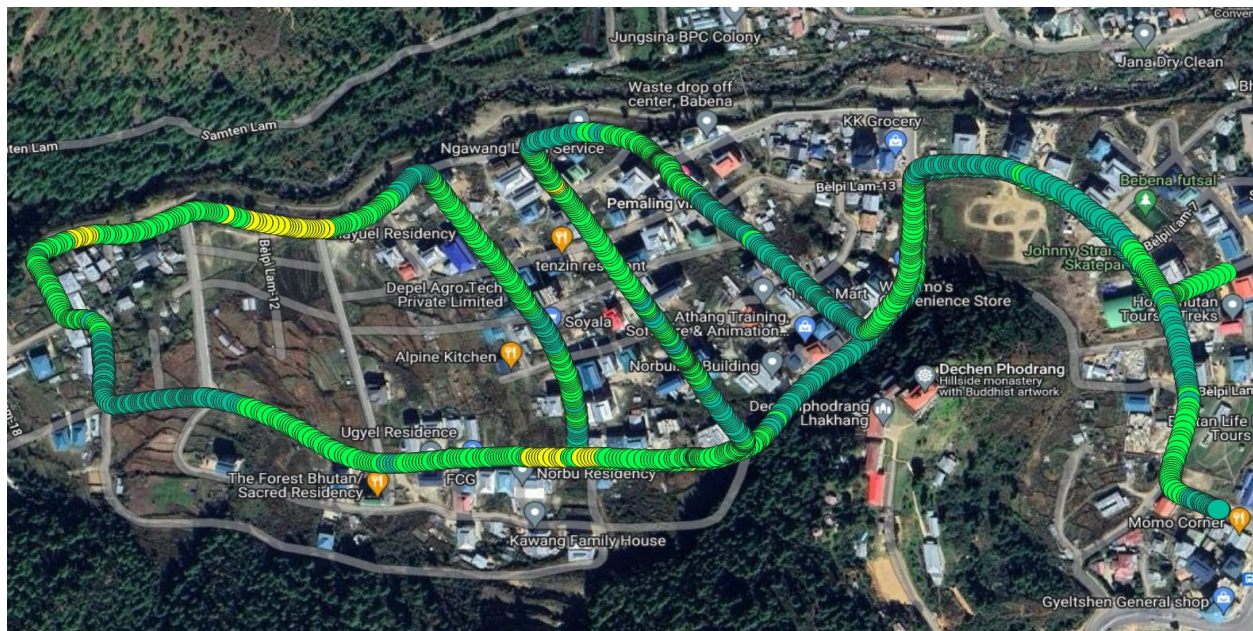
Figure number 1.1 : RSRP plot 4G B-mobile (QGIS) [Bebena]

Figure number 1.2 : RSRP plot 4G Tashi Cell (QGIS) [Bebena]

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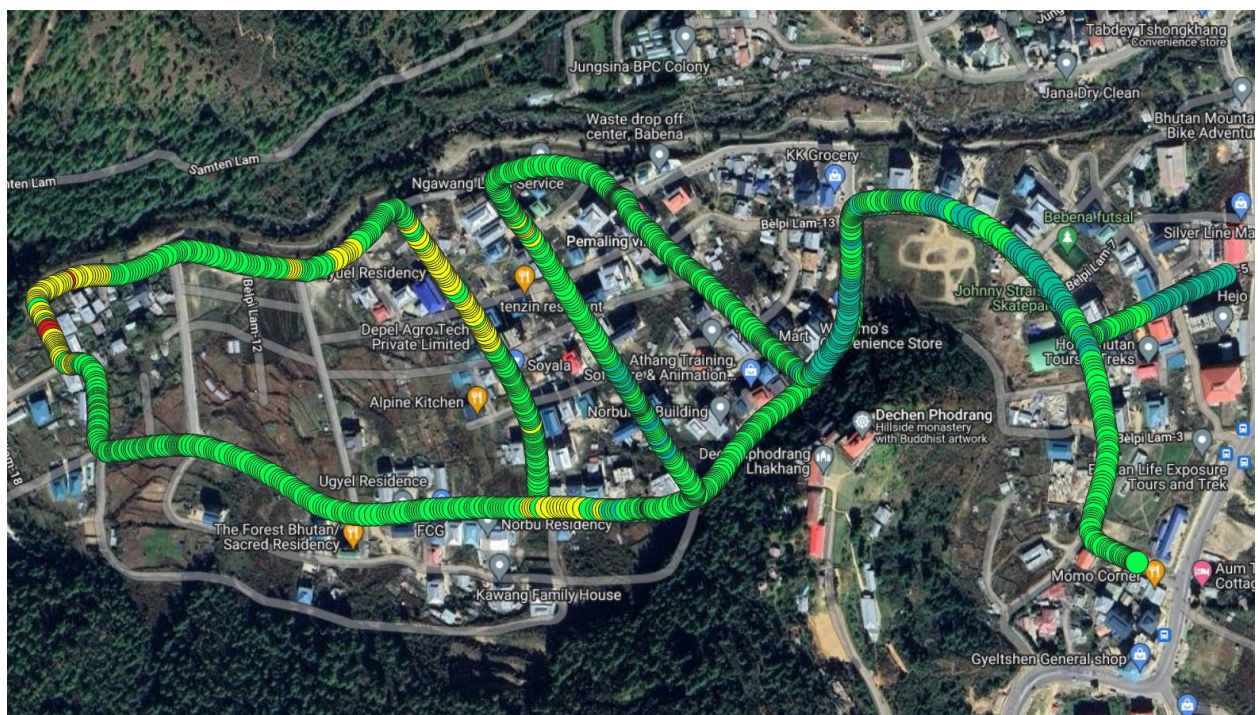
2. *BPC Colony Simtokha*

- *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.6	5.91	No issue
TICL	0	4.2	5.36	No issue

- *Data Throughputs (Mbps) (4G)*

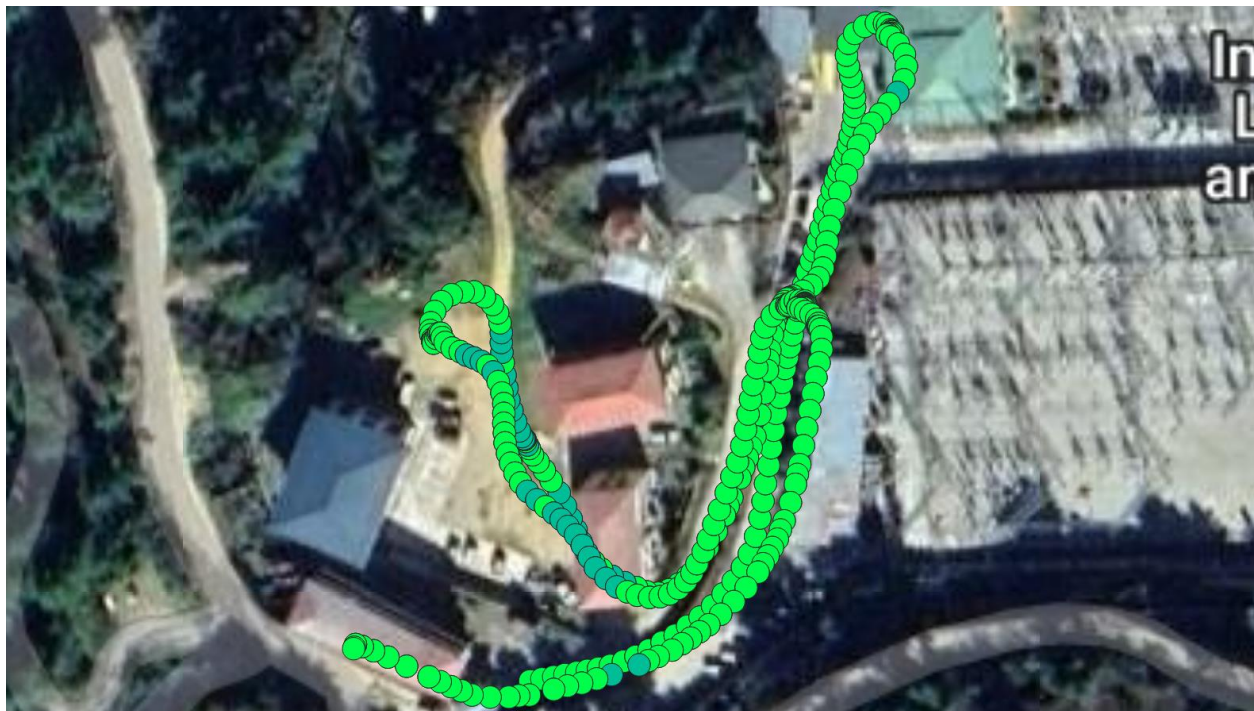| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	20.74	25.26	No issue
TICL	11.99	17.13	No issue

Figure number 2.1 : RSRP plot 4G B-mobile (QGIS) [BPC Colony Semtokha]

Figure number 2.2 : RSRP plot 4G Tashi Cell (QGIS) [BPC Colony Simtokha]

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3. Changjalu

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.75	6.16	No issue
TICL	0	4	7.87	No issue

● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	19.24	13.32	No issue
TICL	13.28	20.59	No issue

Figure number 3.1: RSRP plot 4G B-mobile (QGIS) [Changjalu]

Figure number 3.2: RSRP plot 4G Tashi cell (QGIS) [Changjalu]

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4. Hejo

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.89	7.22	No issue
TICL	0	4.03	6.29	No issue

● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	5.1	7.2	No issue
TICL	18.04	19.03	No issue

Figure number 4.1: RSRP plot 4G B-mobile (QGIS) [Hejo]

Figure number 4.2: RSRP plot 4G Tashi cell (QGIS) [Hejo]

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5. Jungshina

- *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.84	6.65	No issue
TICL	0	4.03	7.01	No issue

- *Data Throughputs (Mbps) (4G)*

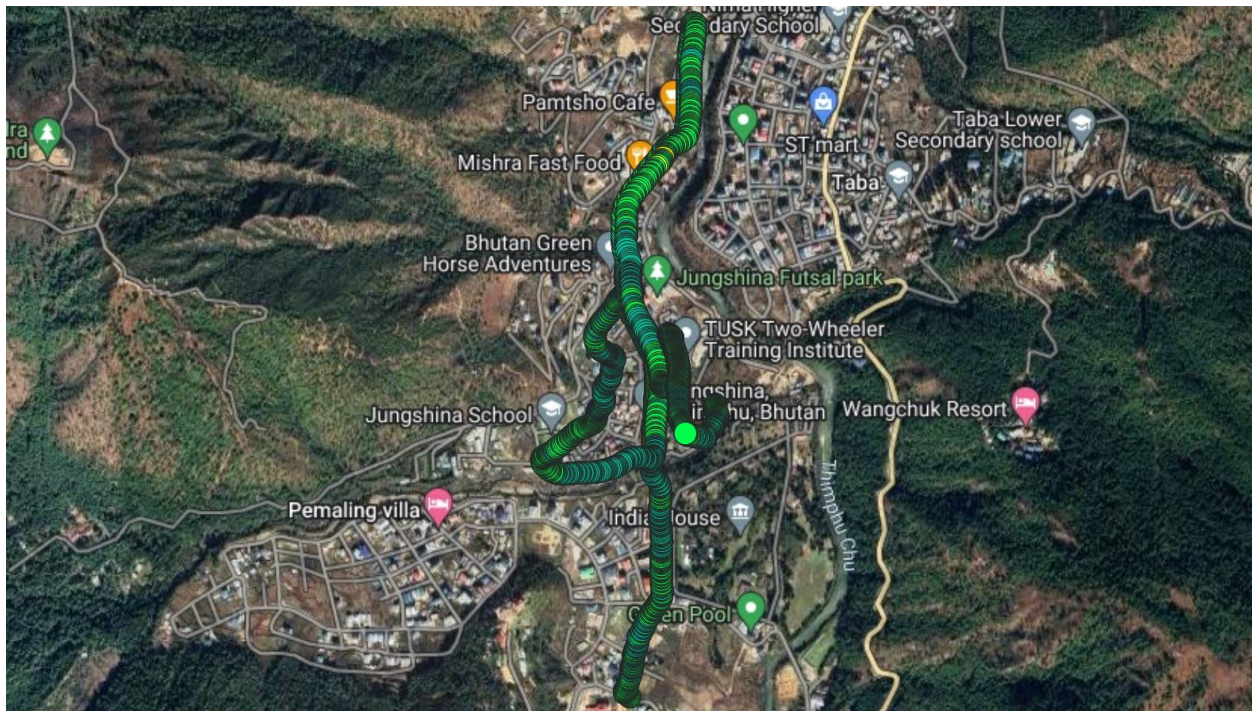| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	16.21	19.61	No issue
TICL	24.93	28.27	No issue

Figure number 5.1: RSRP plot 4G B-mobile (QGIS) [Jungshina]

Figure number 5.2: RSRP plot 4G Tashi cell (QGIS) [Jungshina]

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6. Olakha Workshop

- ● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.85	6.53	No issue
TICL	0	3.98	7.58	No issue

- ● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	9.9	17.31	No issue
TICL	22.56	22.39	No issue

Figure number 6.1: RSRP plot 4G B-mobile (QGIS) [Olakha Workshop]

Figure number 6.2: RSRP plot 4G Tashi cell (QGIS) [Olakha Workshop]

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7. Old BICMA Office Area

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.7	6.47	No issue
TICL	0	3.87	6.44	No issue

● *Data Throughputs (Mbps) (4G)*

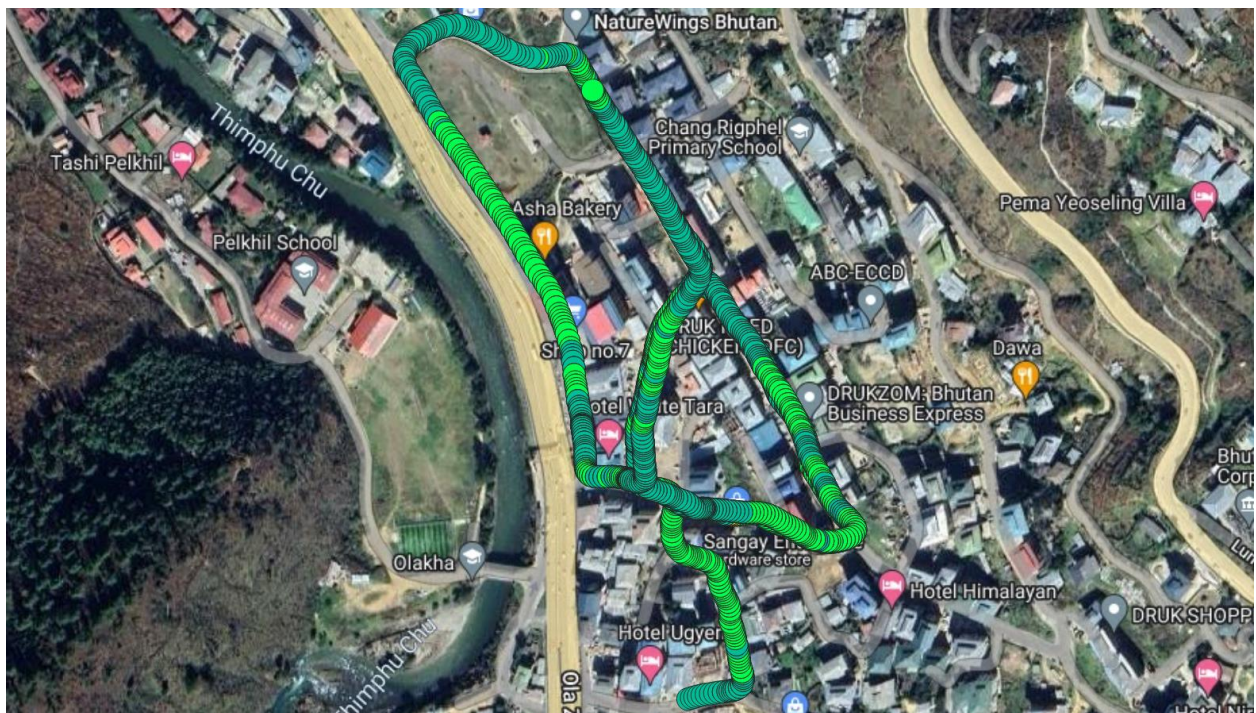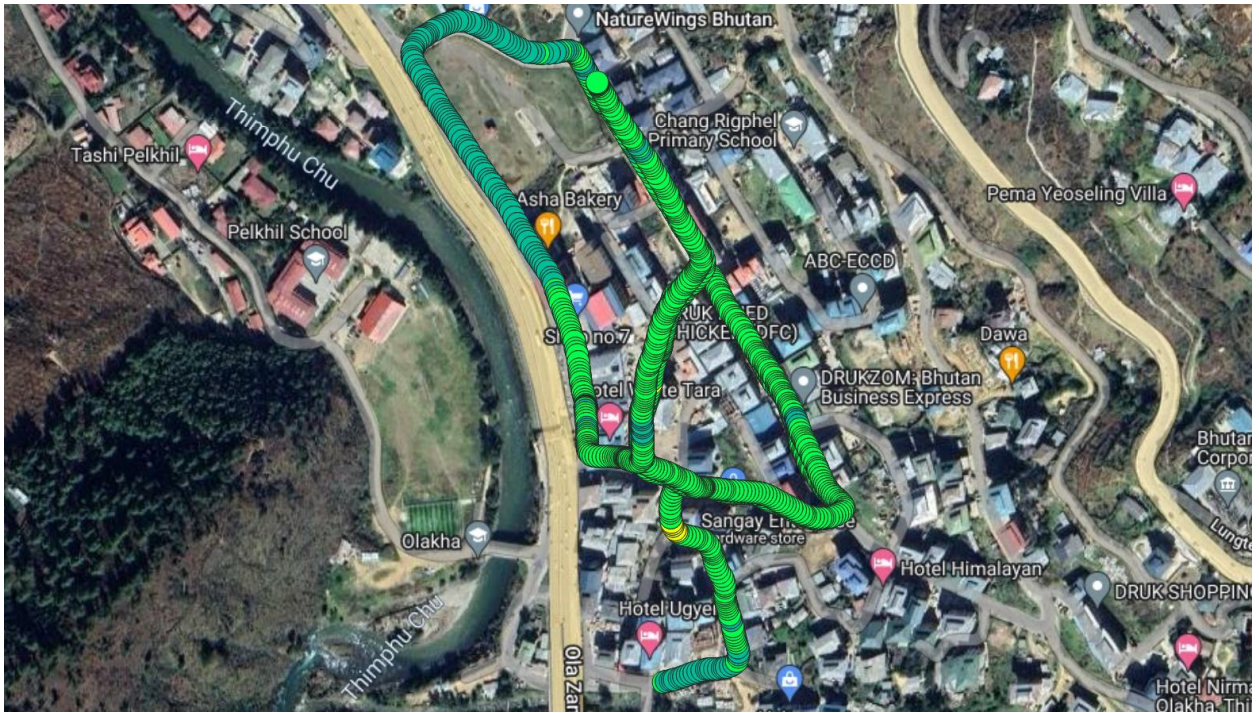| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	17.61	13.51	No issue
TICL	9.3	13.26	No issue

Figure number 7.1: RSRP plot 4G B-mobile (QGIS) [Old BICMA Office Area]

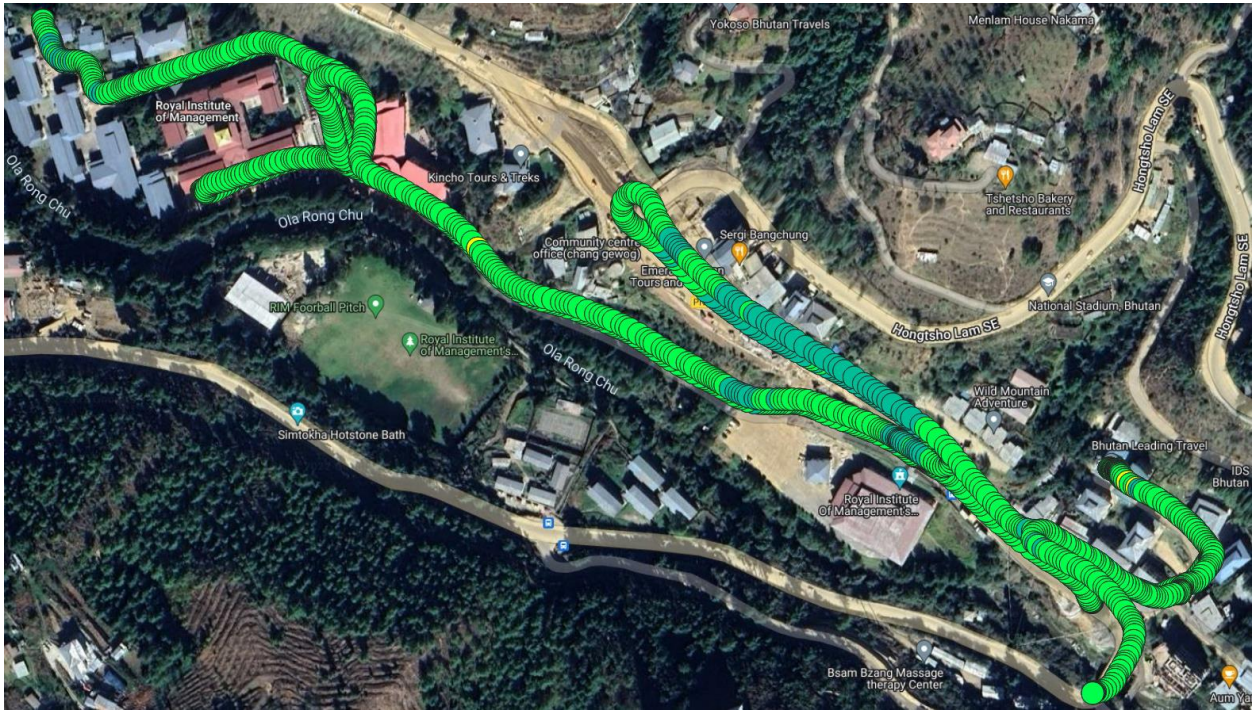*Figure number 7.2: RSRP plot 4G Tashi cell (QGIS) [Old BICMA Office Area]*

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8. RIM

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.88	5.97	No issue
TICL	0	3.81	6.19	No issue

● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	14.29	20.04	No issue
TICL	12.21	17.74	No issue

Figure number 8.1: RSRP plot 4G B-mobile (QGIS) [RIM]

Figure number 8.2: RSRP plot 4G Tashi cell (QGIS) [RIM]

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9. Semtokha Dzong

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.86	5.68	No issue
TICL	0	4.09	5.89	No issue

● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	15.91	32.25	No issue
TICL	6.99	16.82	No issue

Figure number 9.1: RSRP plot 4G B-mobile (QGIS) [Semtokha Dzong]
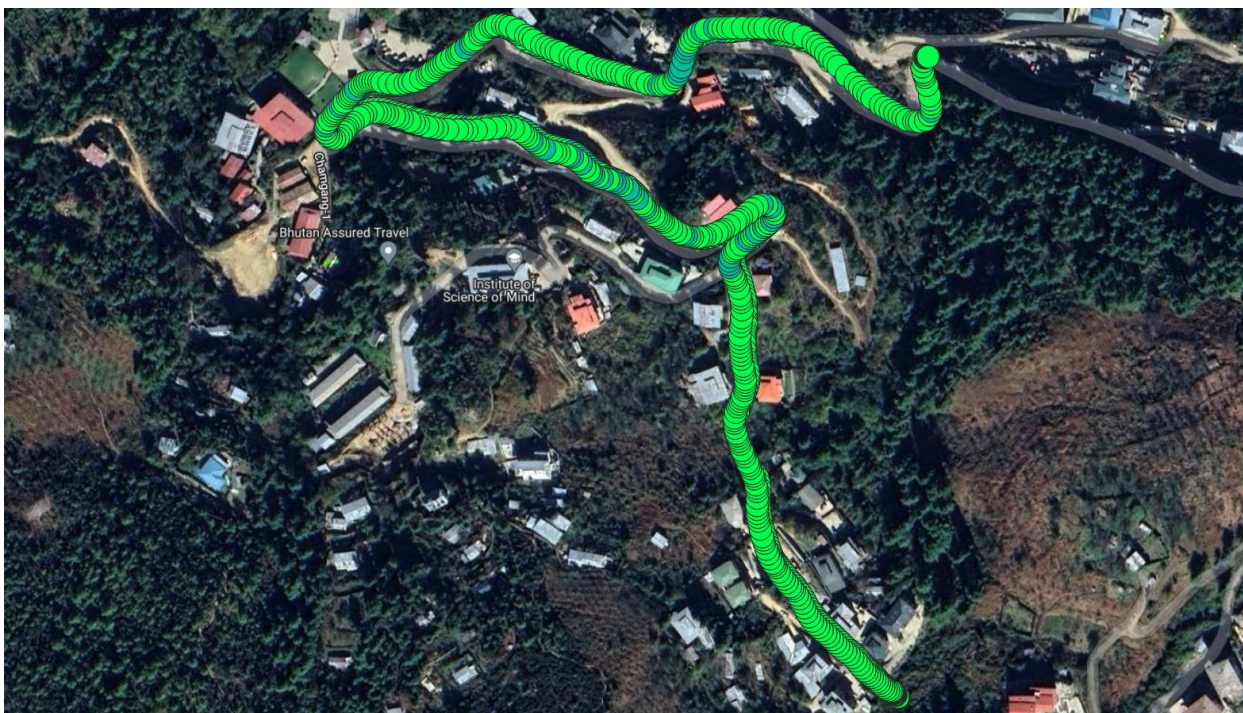
Figure number 9.2: RSRP plot 4G Tashi cell (QGIS) [Semtokha Dzong]

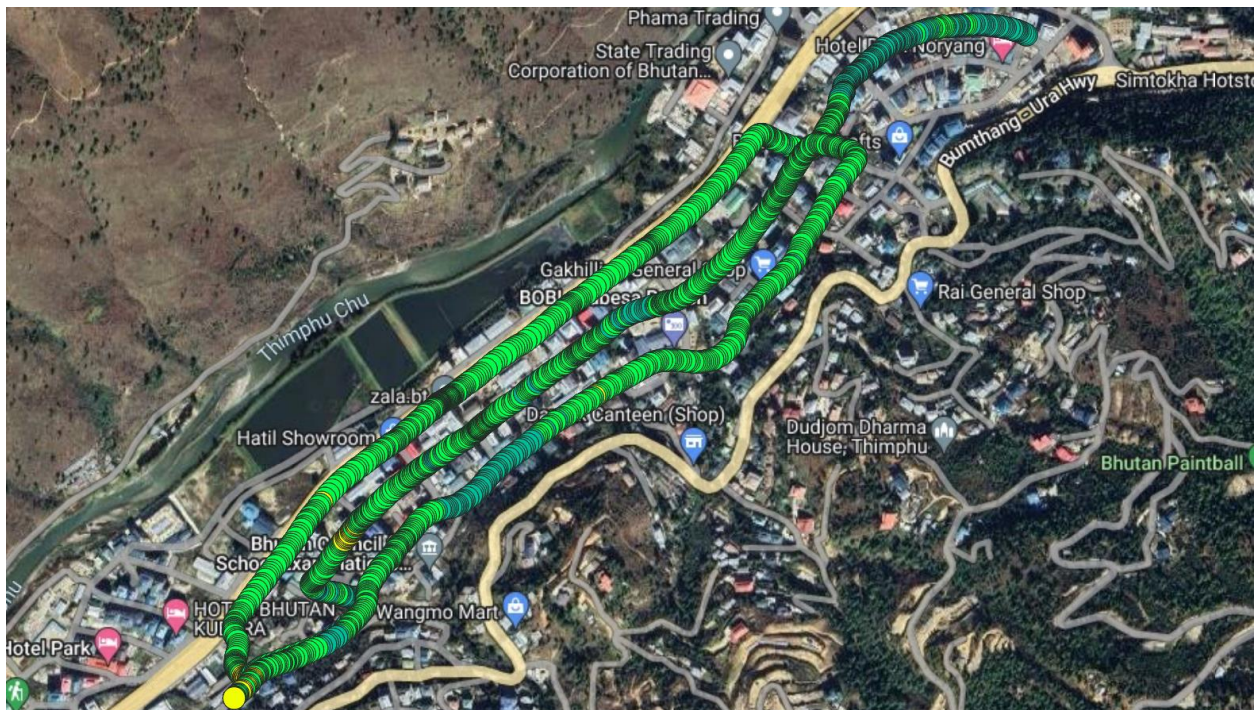..

10. Bhutan Kitchen and Village Restaurant Babesa Area

- ● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.82	7.05	No issue
TICL	0	3.75	**10.07**	**Issue with CFBST**

- ● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	16.04	16.75	No issue
TICL	11.87	17.470	No issue

Figure number 10.2: RSRP plot 4G Tashi cell (QGIS) [Bhutan Kitchen and Village Restaurant Babesa]

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11. Dr.Tobgay School area Babesa

- *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.75	6.99	No issue
TICL	0	3.58	6.08	No issue

- *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	13.66	7.917	No issue
TICL	6.037	10.35	No issue

Figure number 11.1: RSRP plot 4G B-mobile (QGIS) [Dr.Tobgay School area Babesa]
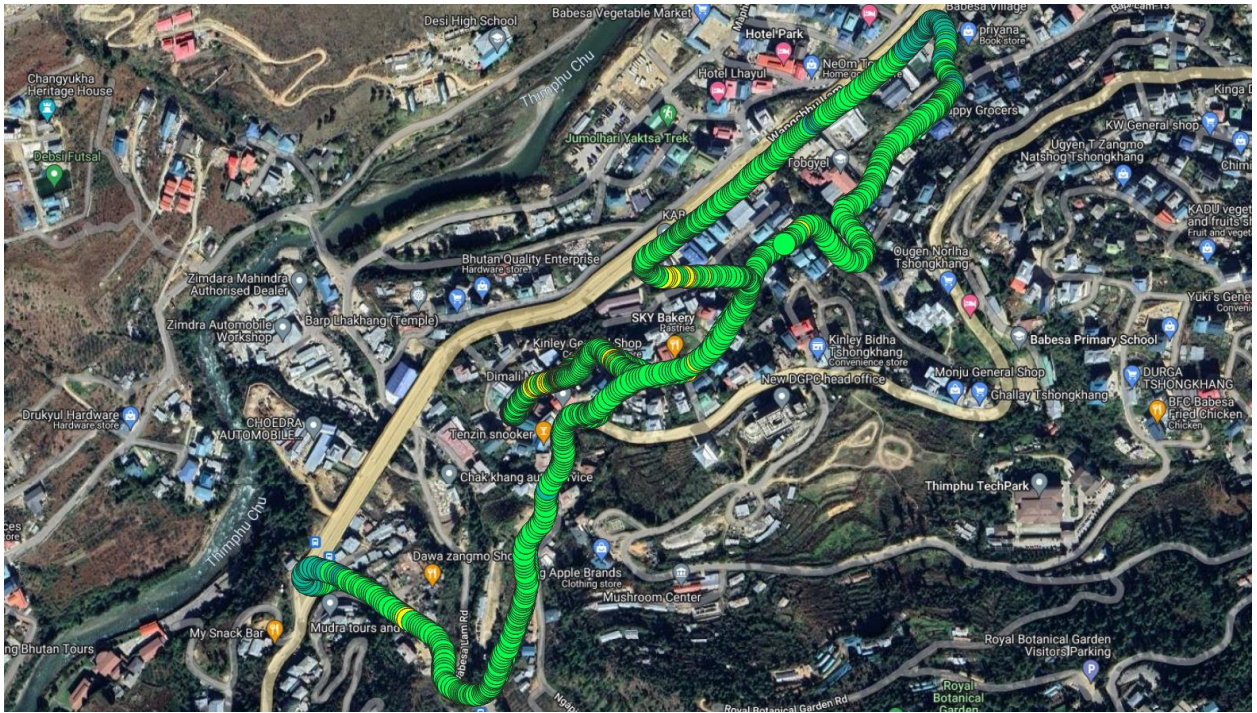
Figure number 11.2: RSRP plot 4G Tashi cell (QGIS) [Dr.Tobgay School area Babesa]

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12. Old Highway Babesa

- **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.63	**9.27**	**Issue with CFBST**
TICL	0	3.58	7.19	No issue

- **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	14.764	14.059	No issue
TICL	8.051	10.524	No issue

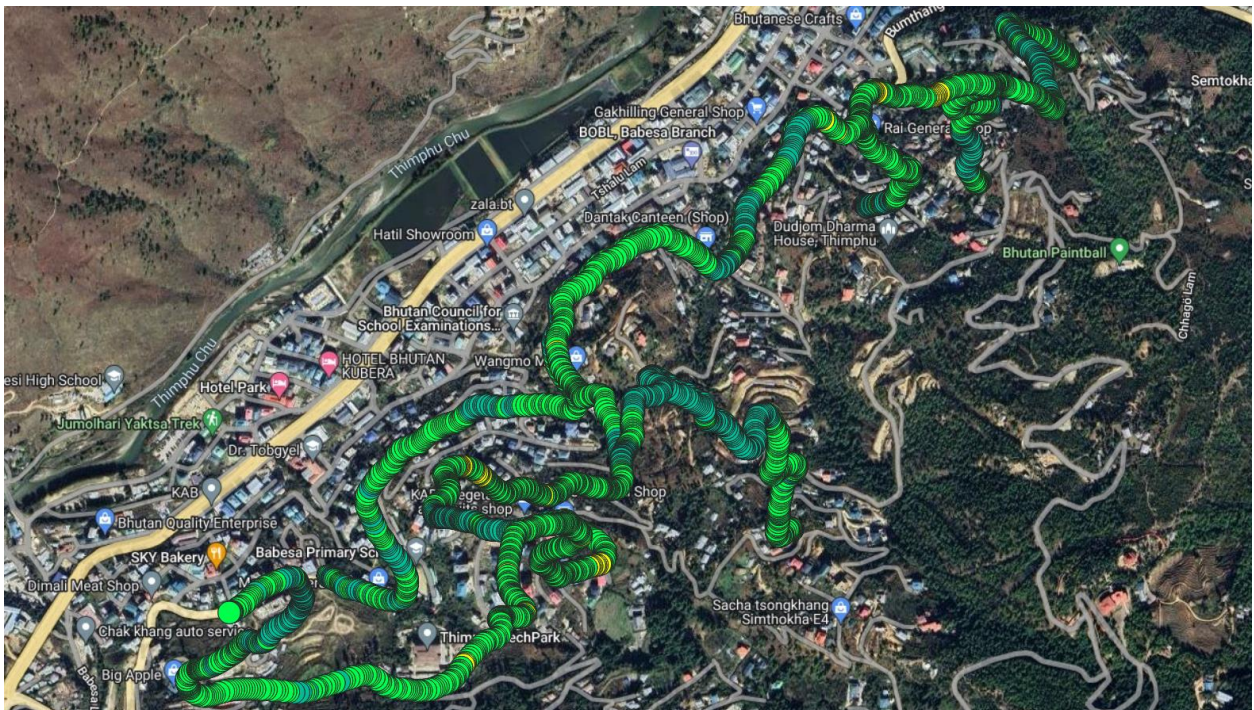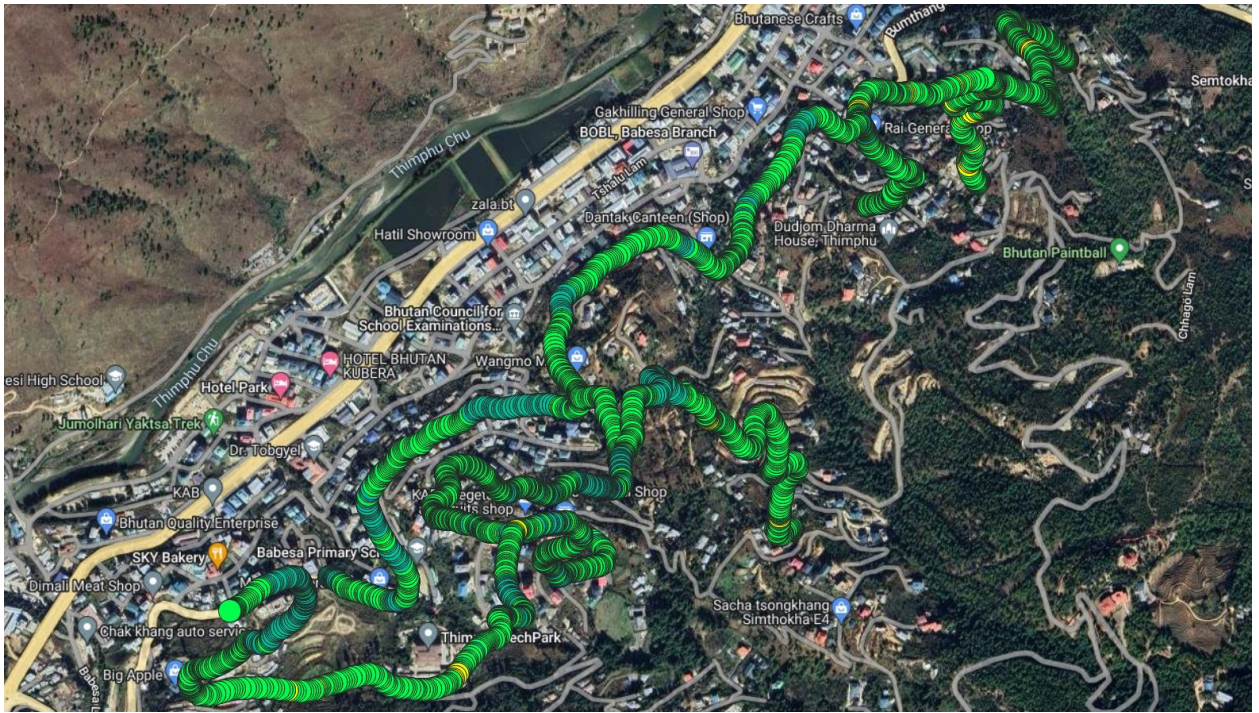*Figure number 12.1: RSRP plot 4G B-mobile (QGIS) [Old highway Babesa]*

Figure number 12.2: RSRP plot 4G Tashi cell (QGIS) [Old highway Babesa]

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13. Below Babesa Highway(Zimdra)

● **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.91	6.49	No issue
TICL	0	3.84	7.72	No issue

● **Data Throughputs (Mbps) (4G)**

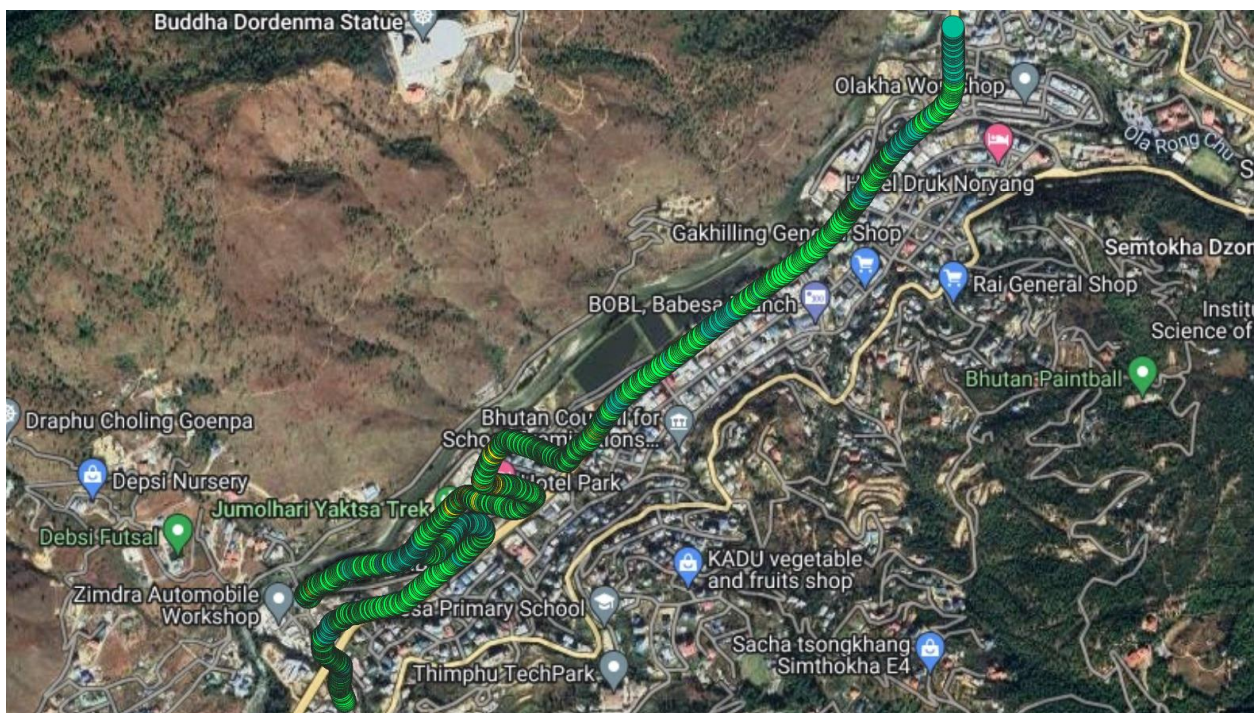| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	20.554	9.714	No issue
TICL	11.059	14.758	No issue

Figure number 13.1: RSRP plot 4G B-mobile (QGIS) [Below Babesa Highway(Zimdra)]

Figure number 13.2: RSRP plot 4G Tashi cell (QGIS) [Below Babesa Highway(Zimdra)]

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14. Lower Pamtsho

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.77	5.92	No issue
TICL	0	4.89	7.49	No issue

● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	11.51	14.95	No issue
TICL	10.08	12.05	No issue

Figure number 14.1: RSRP plot 4G B-mobile (QGIS) [Lower Pamtsho]
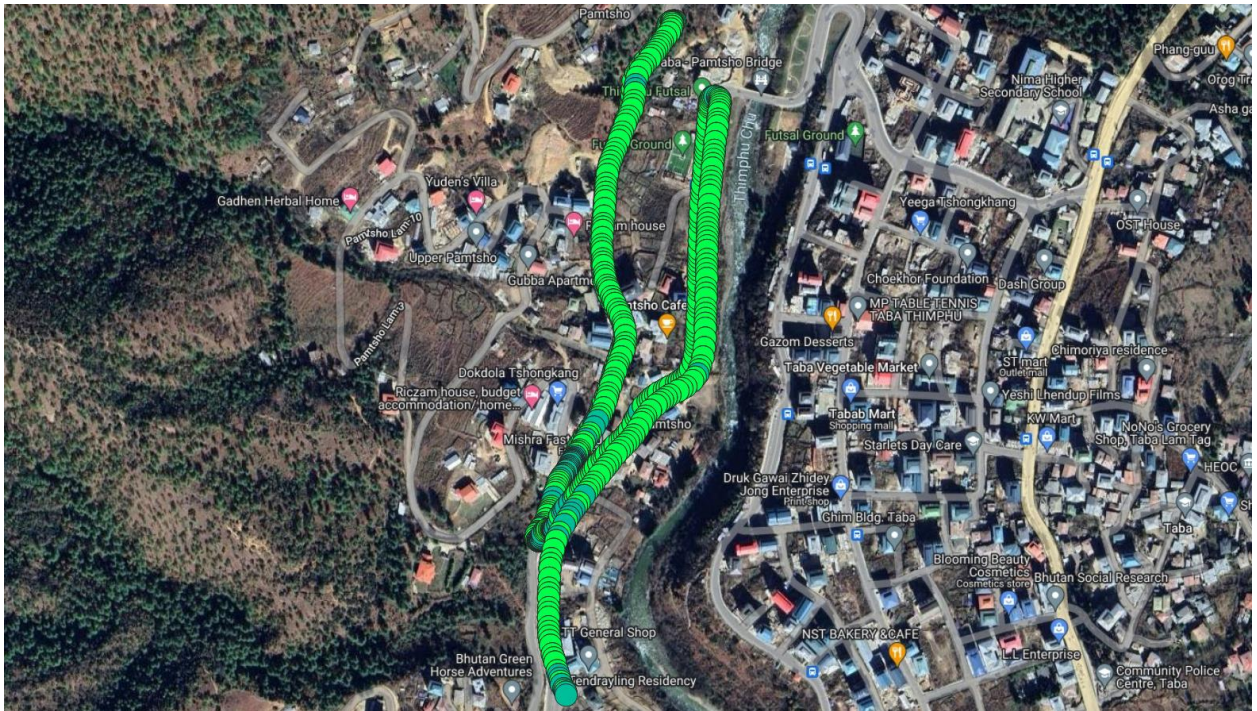
Figure number 14.2: RSRP plot 4G Tashi cell (QGIS) [Lower Pamtsho]

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15. Upper Pamtsho 1

- **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.34	5.26	Issue with MOS
TICL	0	3.74	13.06	Issue with CFBST

- **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	31.74	19.39	No issue
TICL	4.2	11.28	Issue with DL throughput

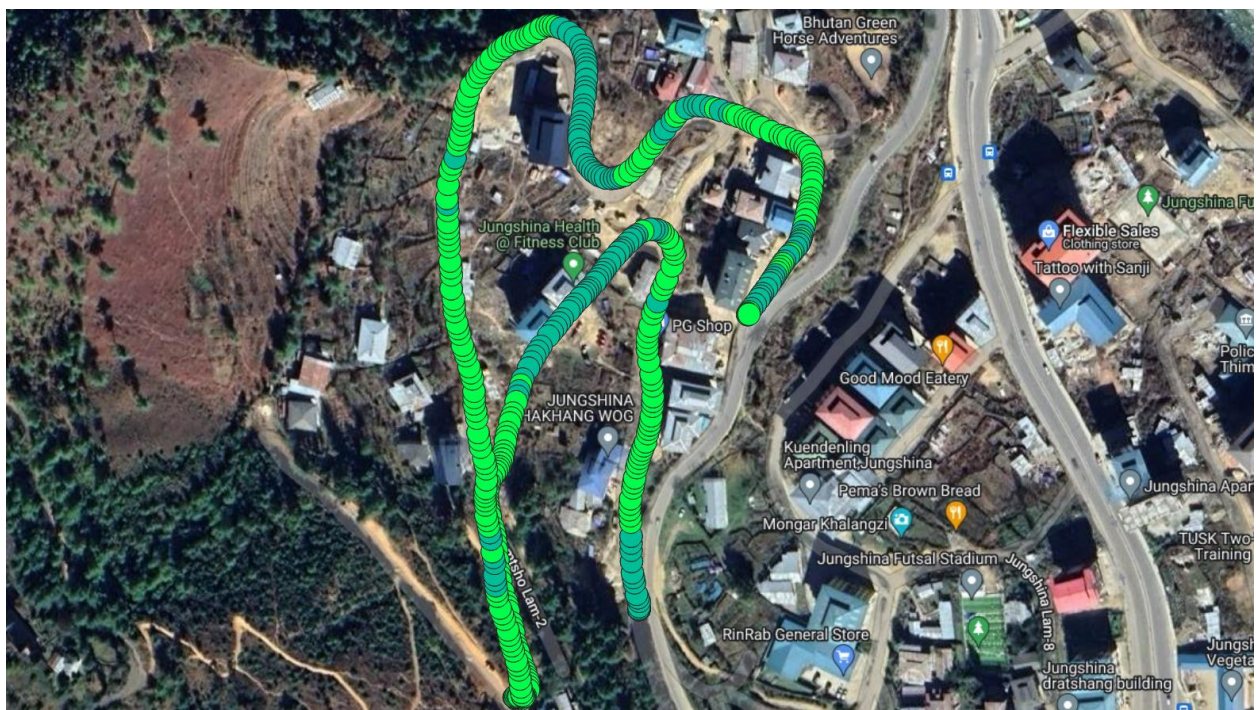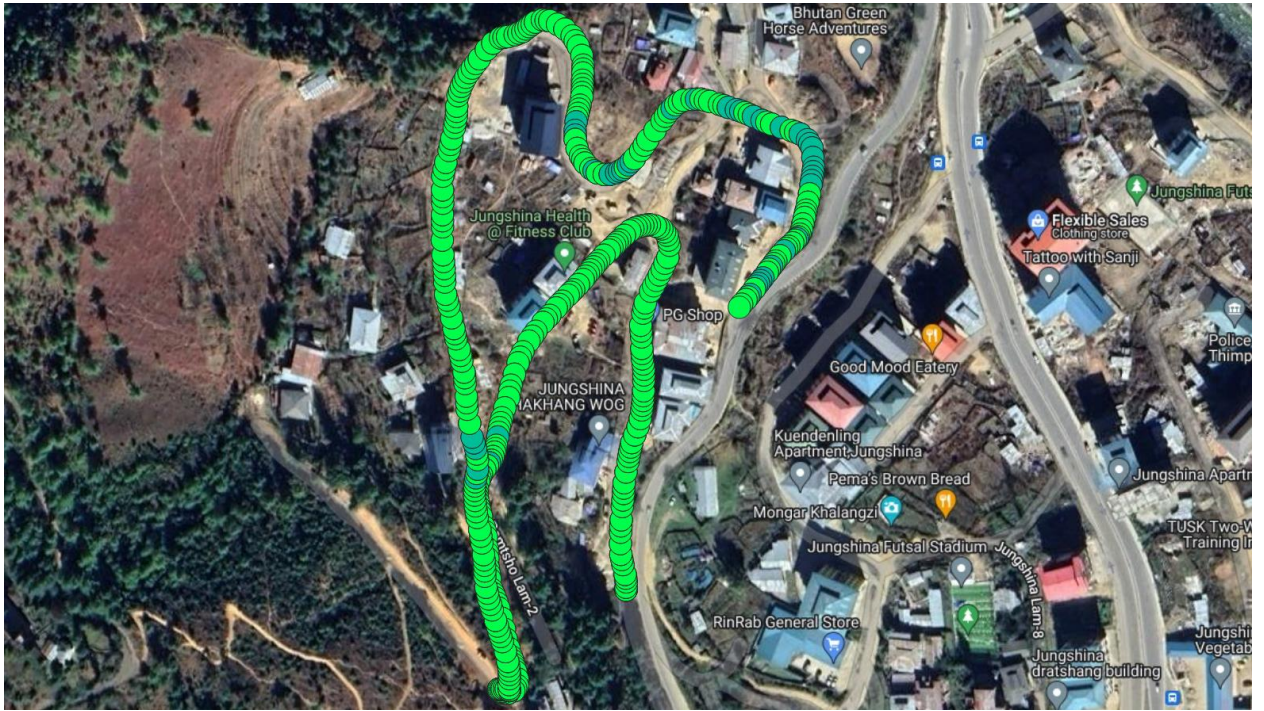*Figure number 15.1: RSRP plot 4G B-mobile (QGIS) [Upper Pamtsho 1]*

Figure number 15.2: RSRP plot 4G Tashi cell (QGIS) [Upper Pamtsho 1]

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16. Upper Pamtsho 2

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.94	6.24	No issue
TICL	0	3.82	8.54	No issue

● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	7.42	12.12	No issue
TICL	12.15	17.15	No issue
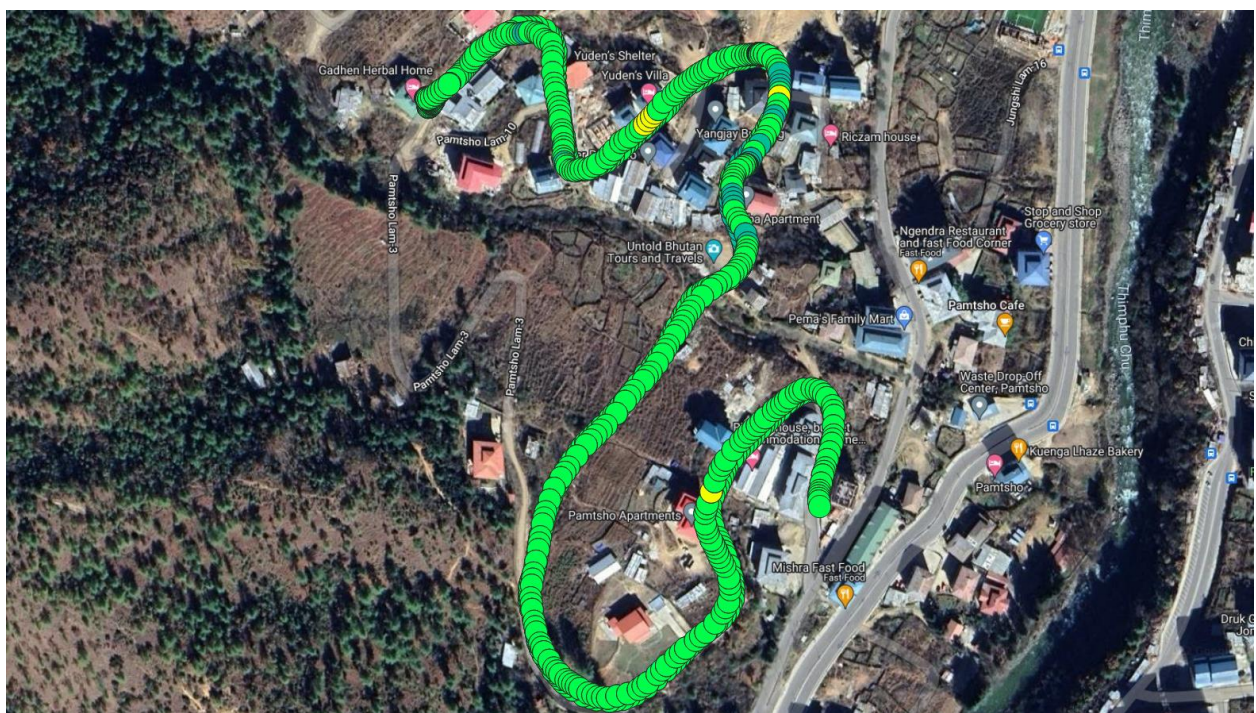
Figure number 16.1: RSRP plot 4G B-mobile (QGIS) [Upper Pamtsho 2]

Figure number 16.2: RSRP plot 4G Tashi cell (QGIS) [Upper Pamtsho 2]

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17. Lower Taba

- **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.85	6.67	No issue
TICL	0	3.72	9.43	Issue with CFBST

- **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	19.87	11.96	No issue
TICL	13.38	11.81	No issue

Figure number 17.1: RSRP plot 4G B-mobile (QGIS) [Lower Taba]

Figure number 17.2: RSRP plot 4G Tashi cell (QGIS) [Lower Taba]

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18. Upper Taba

- **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.84	5.15	No issue
TICL	0	3.92	6.29	No issue

- **Data Throughputs (Mbps) (4G)**

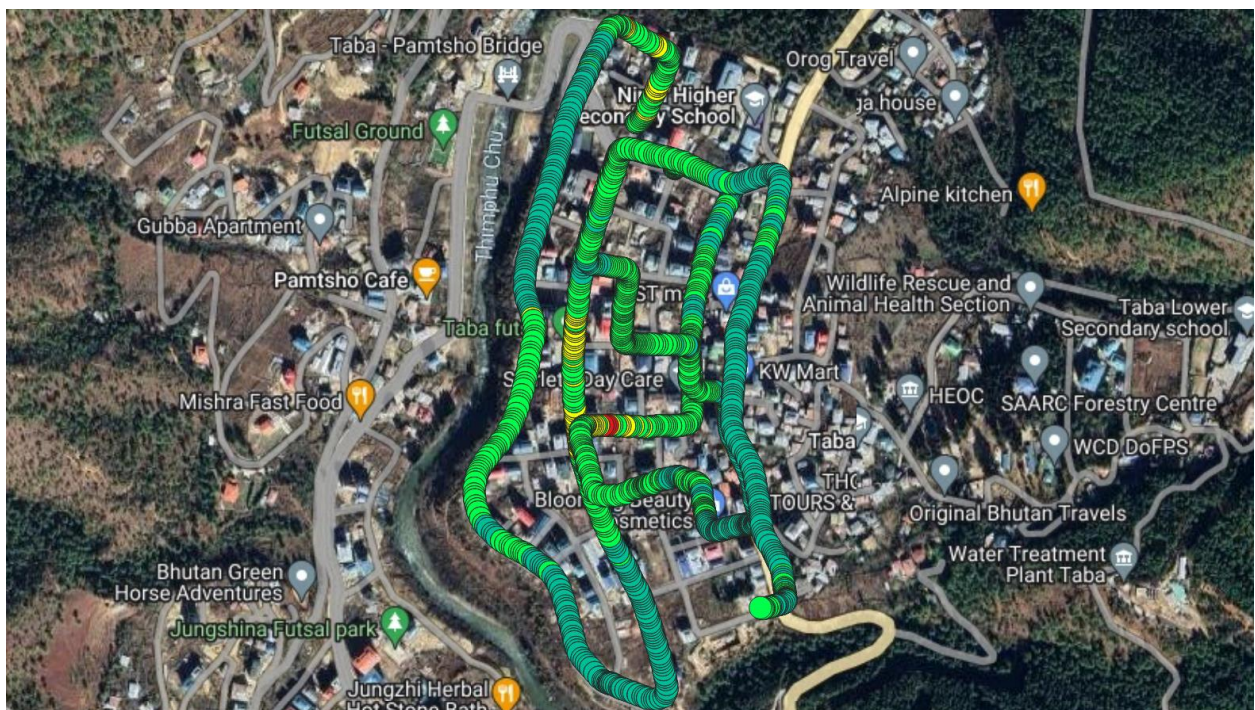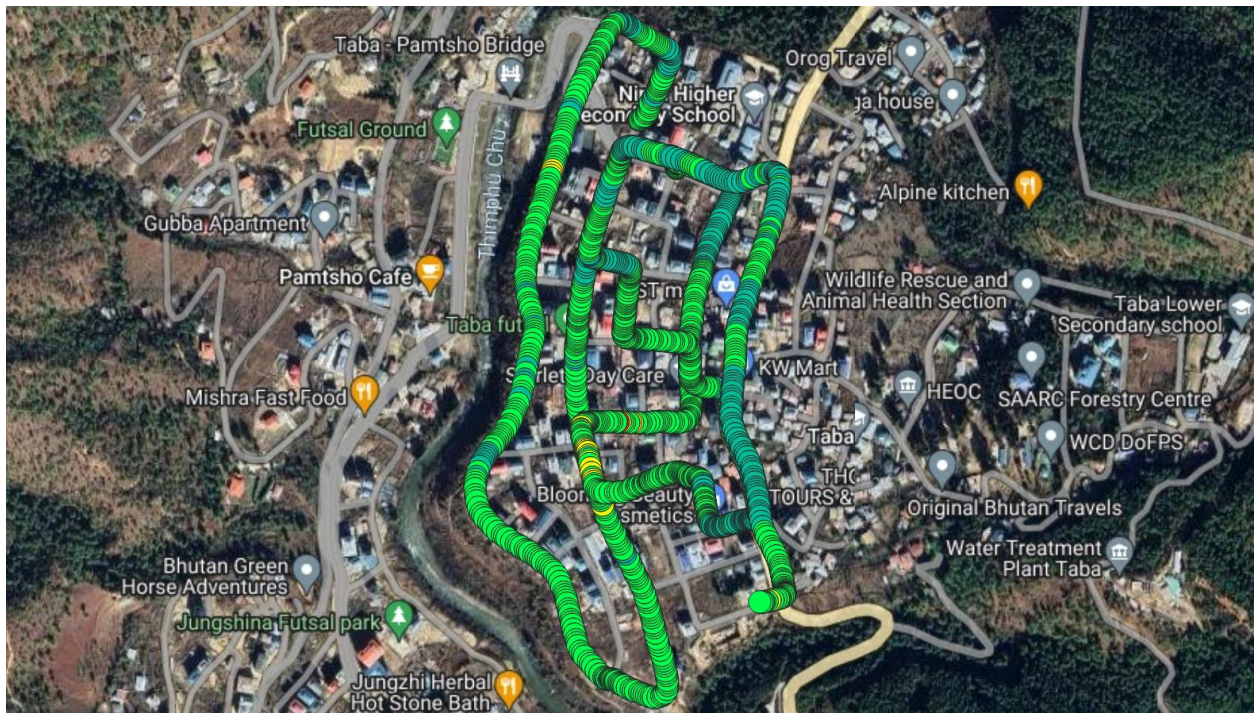| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	32.39	15.815	No issue
TICL	20.77	21.18	No issue

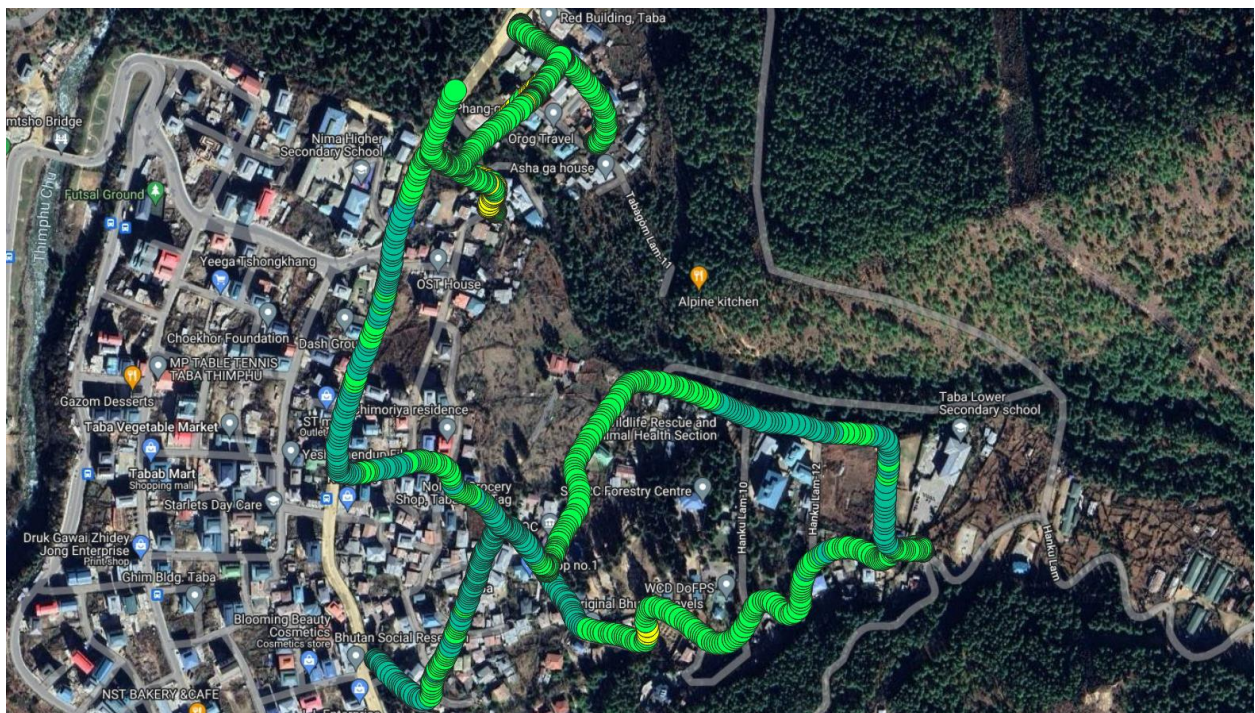*Figure number 18.1: RSRP plot 4G B-mobile (QGIS) [Upper Taba]*

Figure number 18.2: RSRP plot 4G Tashi cell (QGIS) [Upper Taba]

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19. YHSS area

● **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.83	7.15	No issue
TICL	0	3.61	11.51	Issue with CFBST

● **Data Throughputs (Mbps) (4G)**

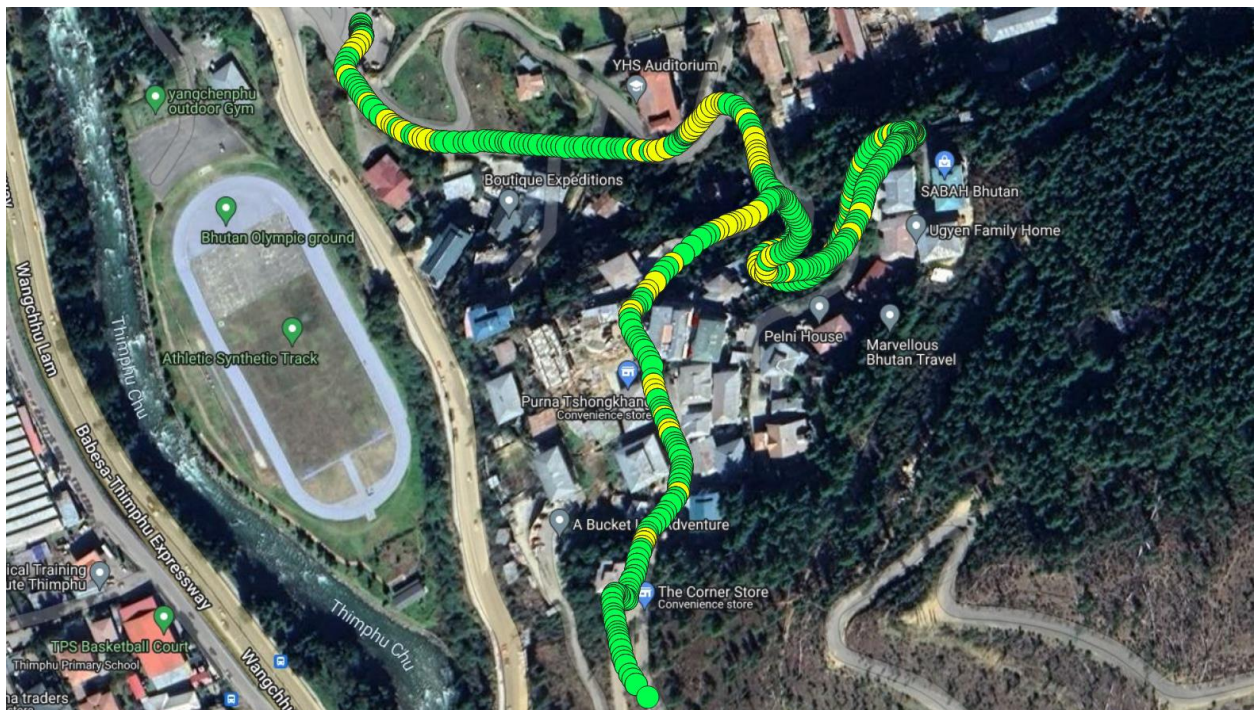| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	3.17	6.01	Issue with DL throughput
TICL	2.61	4.53	Issue with DL throughput

Figure number 19.1: RSRP plot 4G B-mobile (QGIS) [YHSS area]

Figure number 19.2: RSRP plot 4G Tashi cell (QGIS) [YHSS area]

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20. Lower Town

- *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.89	6.34	No issue
TICL	0	3.80	6.96	No issue

- *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	21.7	20.7	No issue
TICL	17.3	25.3	No issue

Figure number 20.1: RSRP plot 4G B-mobile (QGIS) [Lower Town]

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Figure number 20.2: RSRP plot 4G Tashi cell (QGIS) [Lower Town]

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21. Upper Town

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.87	6.89	No issue
TICL	0	3.76	7.68	No issue

● *Data Throughputs (Mbps) (4G)*

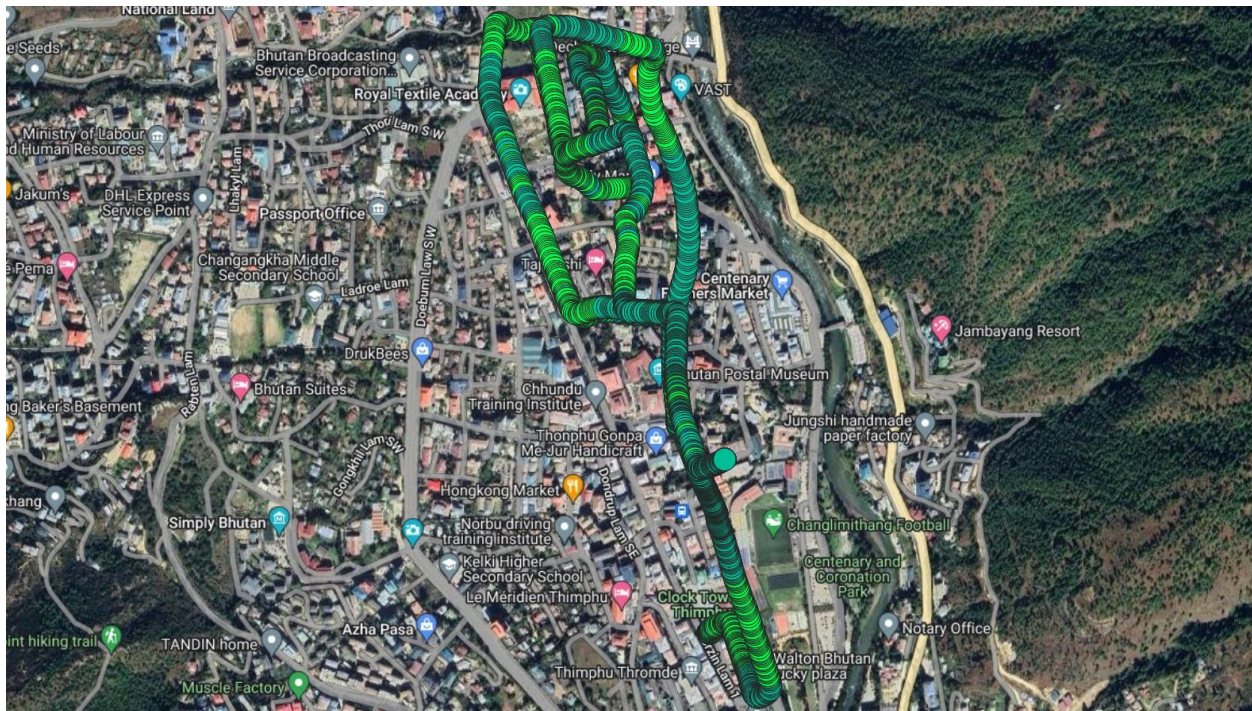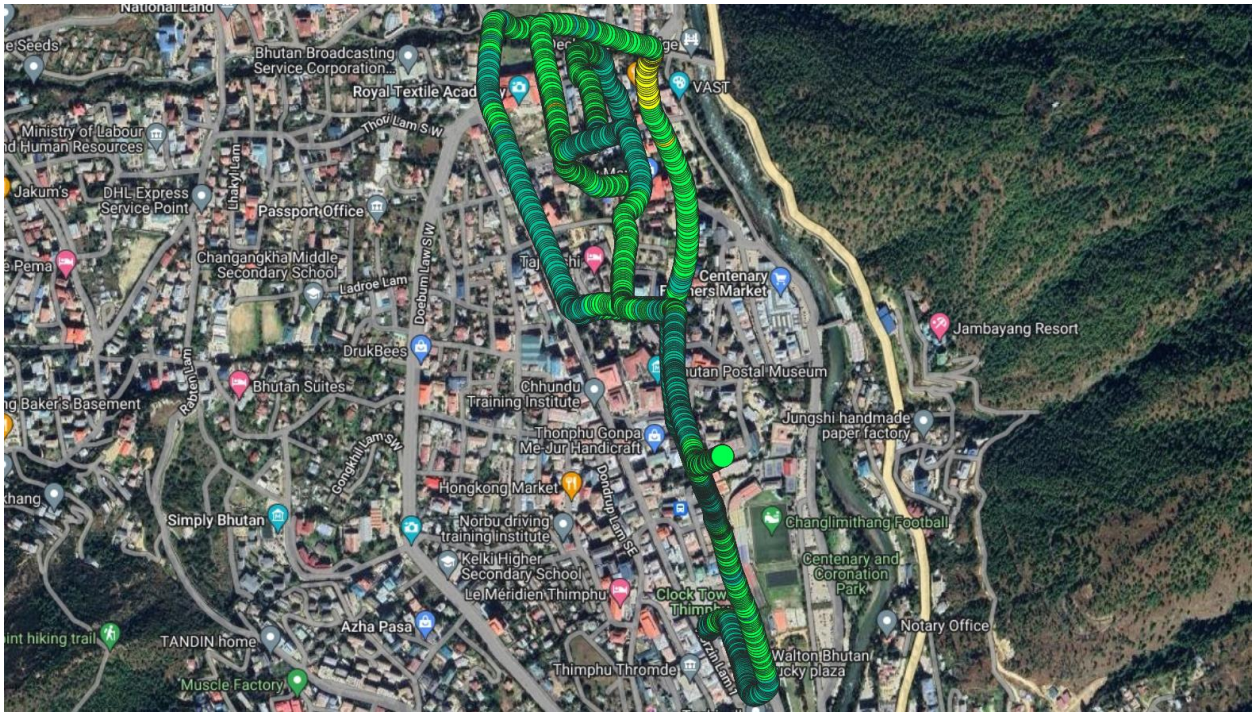| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	14.68	16.53	No issue
TICL	16.35	15.61	No issue

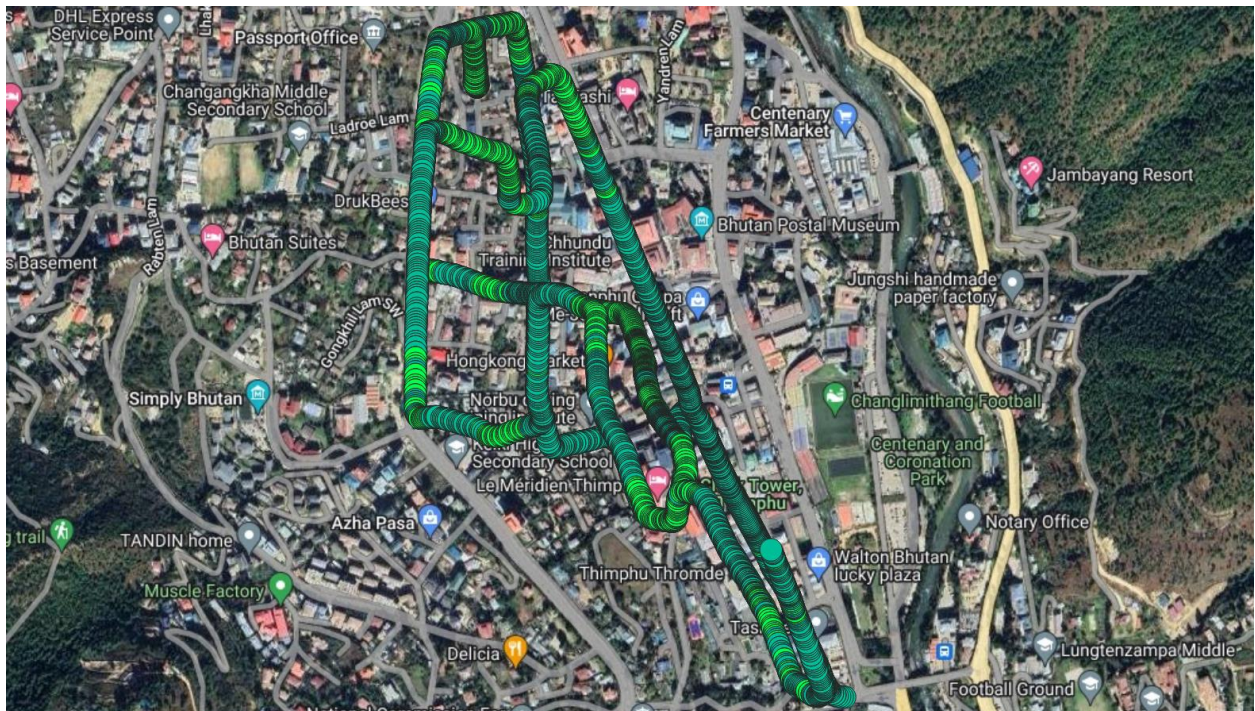*Figure number 21.1: RSRP plot 4G B-mobile (QGIS) [Upper Town]*

Figure number 21.2: RSRP plot 4G Tashi cell (QGIS) [Upper Town]

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22. Vegetable Market

- *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.91	6.41	No issue
TICL	0	3.82	6.78	No issue

- *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	25.66	21.35	No issue
TICL	22.85	18.47	No issue
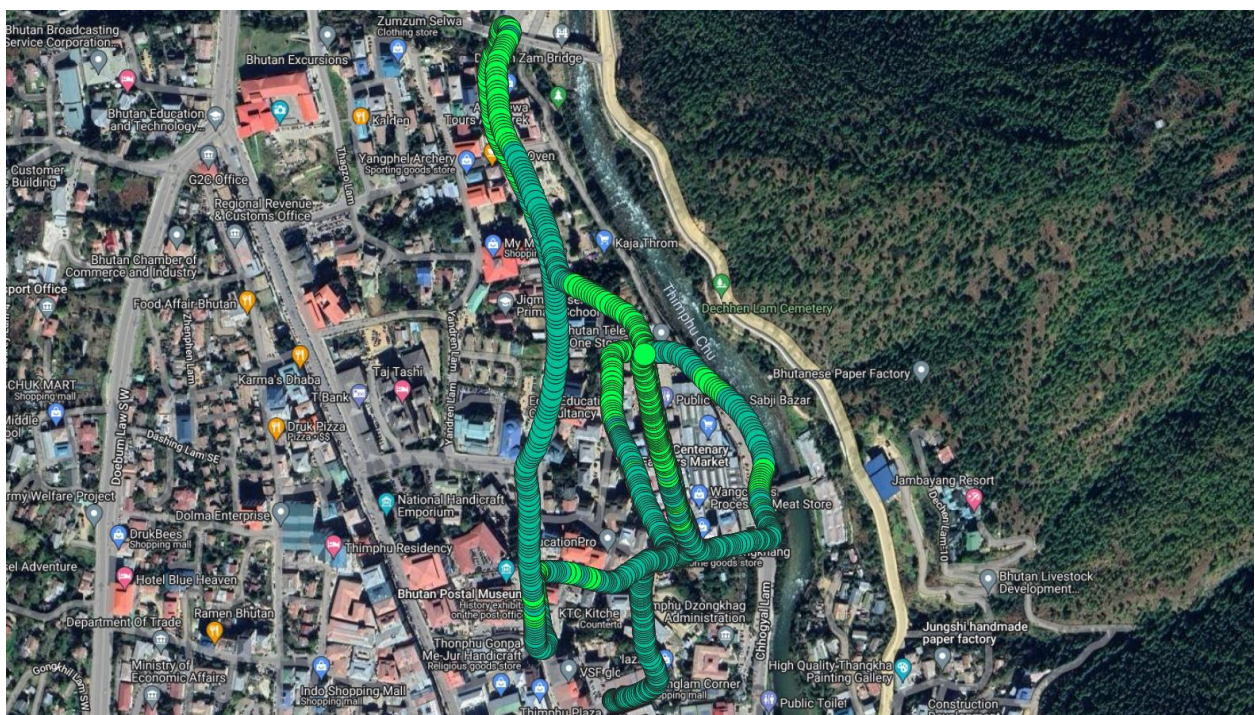
Figure number 22.1: RSRP plot 4G B-mobile (QGIS) [Vegetable Market]

Figure number 22.2: RSRP plot 4G Tashi cell (QGIS) [Vegetable Market]

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23. Kaja Throm

● **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.75	5.88	No issue
TICL	0	3.76	6.11	No issue

● **Data Throughputs (Mbps) (4G)**

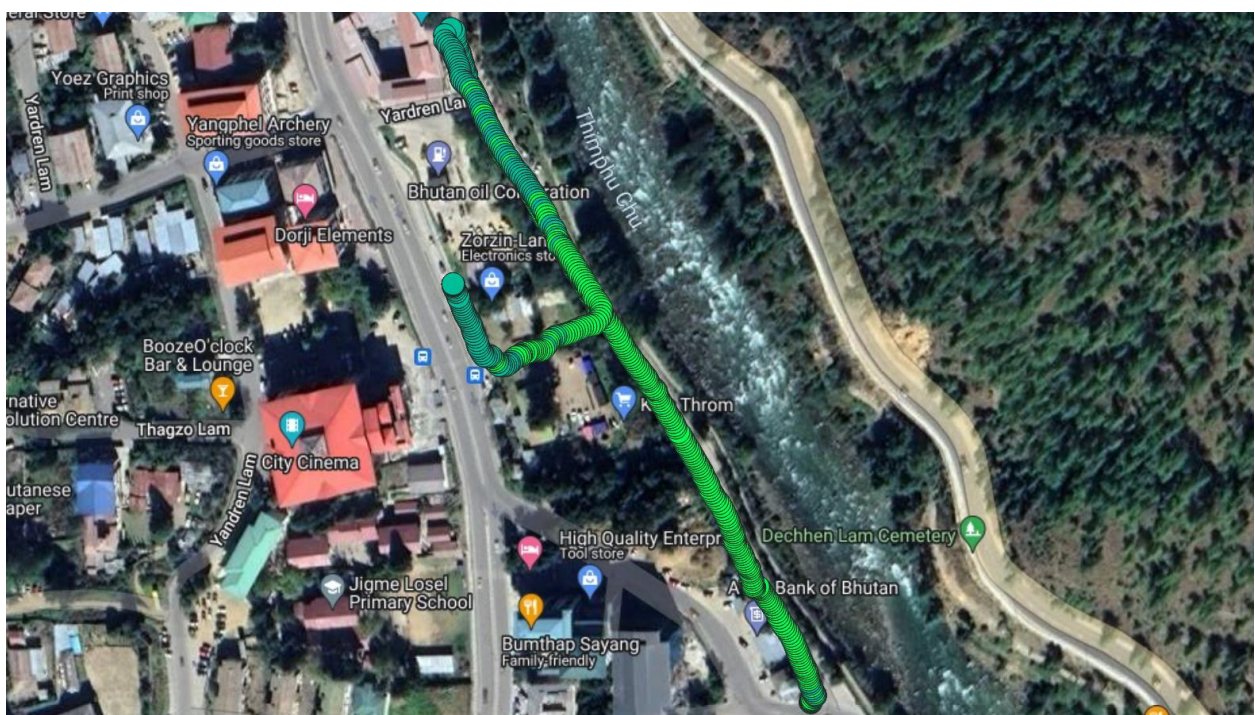| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	28.25	23.16	No issue
TICL	12.29	14.4	No issue

Figure number 23.1: RSRP plot 4G B-mobile (QGIS) [Kaja Throm]
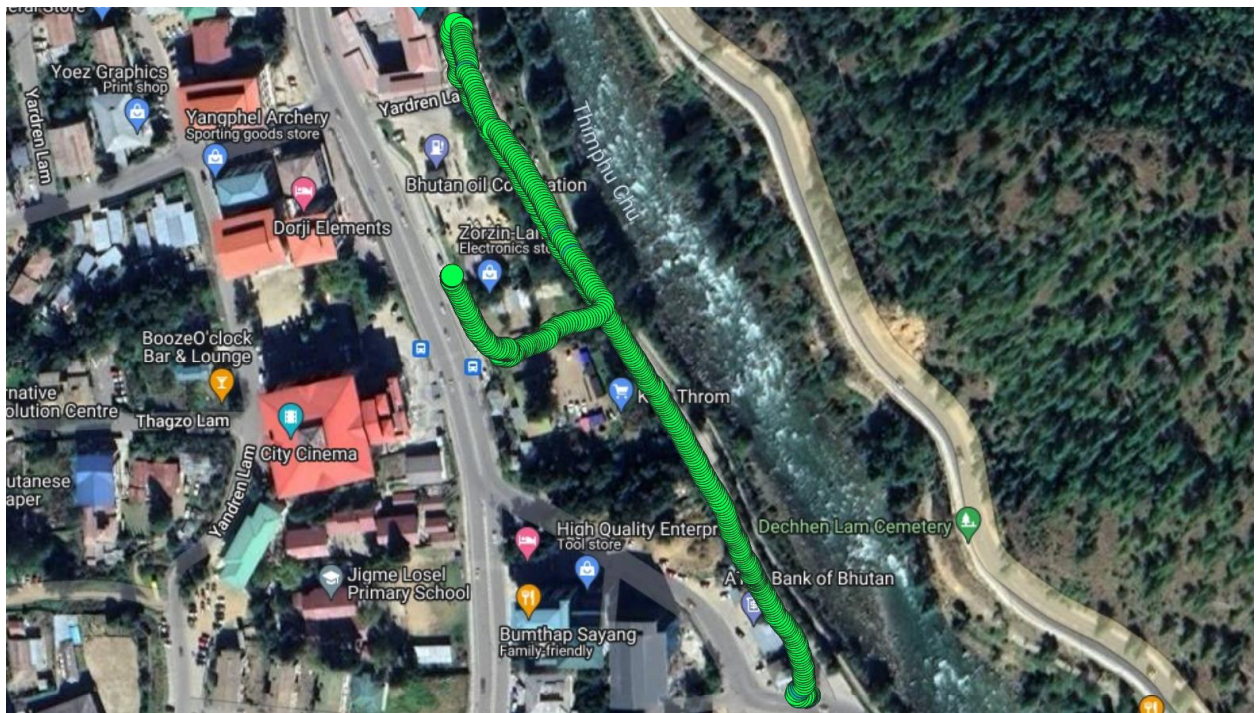
Figure number 23.2: RSRP plot 4G Tashi cell (QGIS) [Kaja Throm]

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24. Changbangdu

- **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.79	7.00	No issue
TICL	0	3.99	6.5	No issue

- **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	9.54	16.11	No issue
TICL	10.97	14.14	No issue

Figure number 24.1: RSRP plot 4G B-mobile (QGIS) [Changbandu]
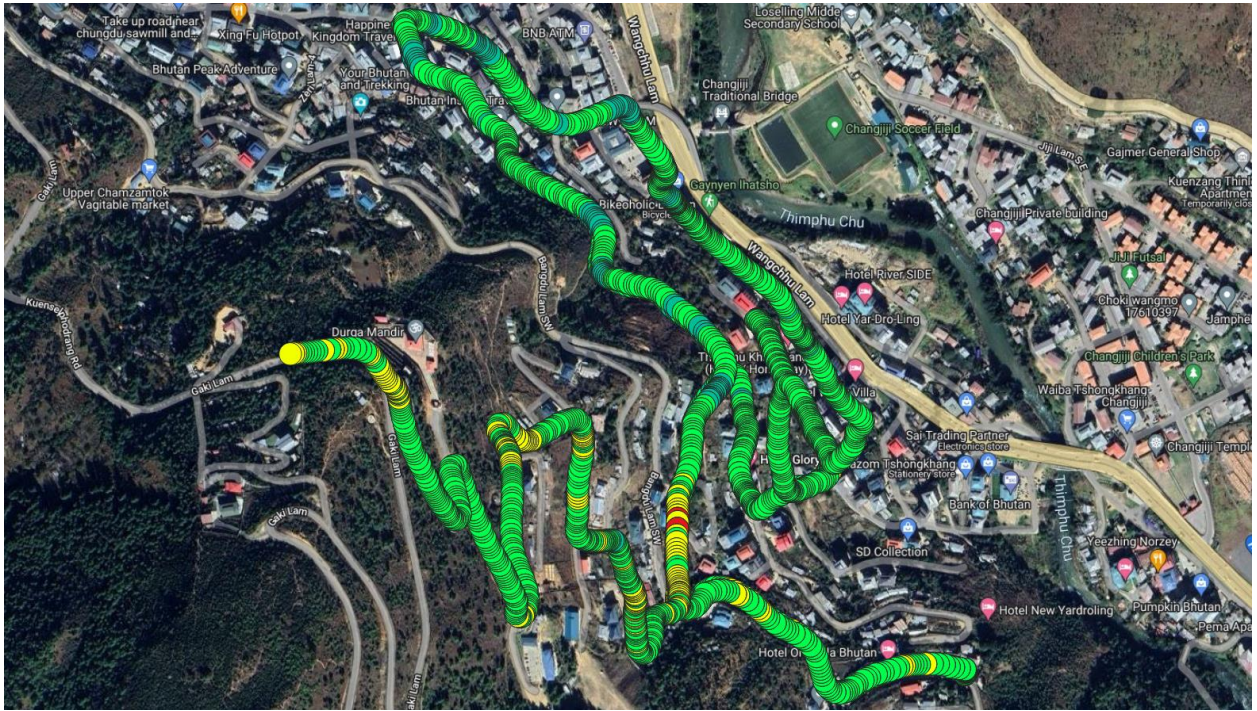
Figure number 24.2: RSRP plot 4G Tashi cell (QGIS) [Changbandu]

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25. Changzamtog

● **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.87	7.26	No issue
TICL	0	3.97	6.03	No issue

● **Data Throughputs (Mbps) (4G)**

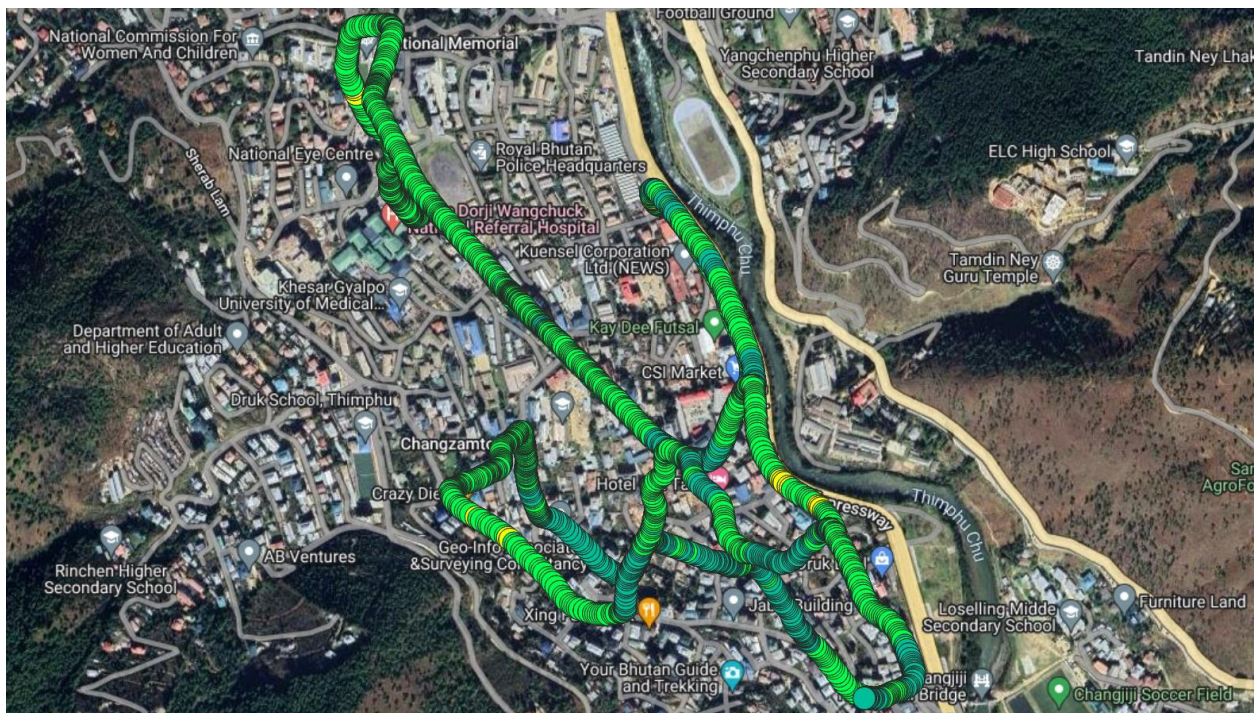| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	24.3	16.82	No issue
TICL	14.04	21.06	No issue

Figure number 25.1: RSRP plot 4G B-mobile (QGIS) [Changzamtog]

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Figure number 25.2: RSRP plot 4G Tashi cell (QGIS) [Changzamtog]

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26. NPPF Colony

● **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.82	6.46	No issue
TICL	0	3.88	6.52	No issue

● **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	31.81	12.48	No issue
TICL	23.34	17.98	No issue

Figure number 26.1: RSRP plot 4G B-mobile (QGIS) [NPPF Colony]

Figure number 26.2: RSRP plot 4G Tashi cell (QGIS) [NPPF Colony]
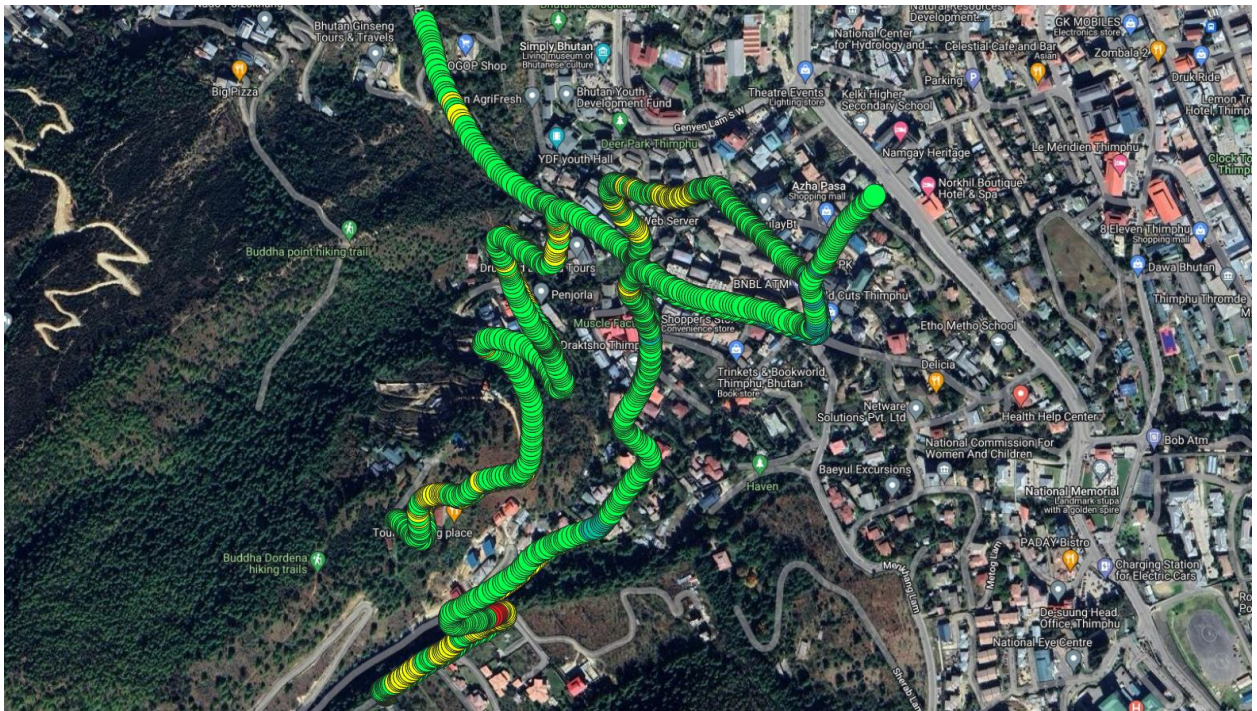
27. Changangkha (Housing,CMSS and RKPS)

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.86	6.84	No issue
TICL	0	3.91	8.38	No issue

● *Data Throughputs (Mbps) (4G)*

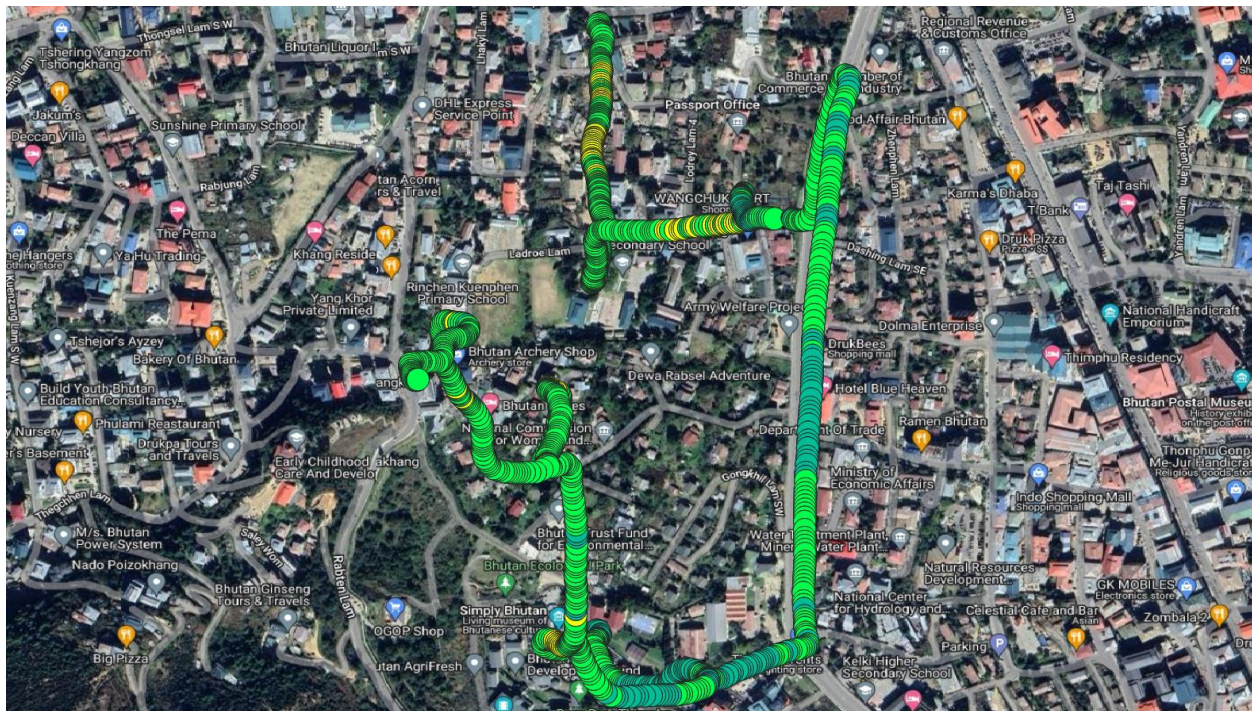| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	23.87	15.86	No issue
TICL	26.73	15.31	No issue

Figure number 27.1: RSRP plot 4G B-mobile (QGIS) [Changangkha (Housing,CMSS and RKPS)]
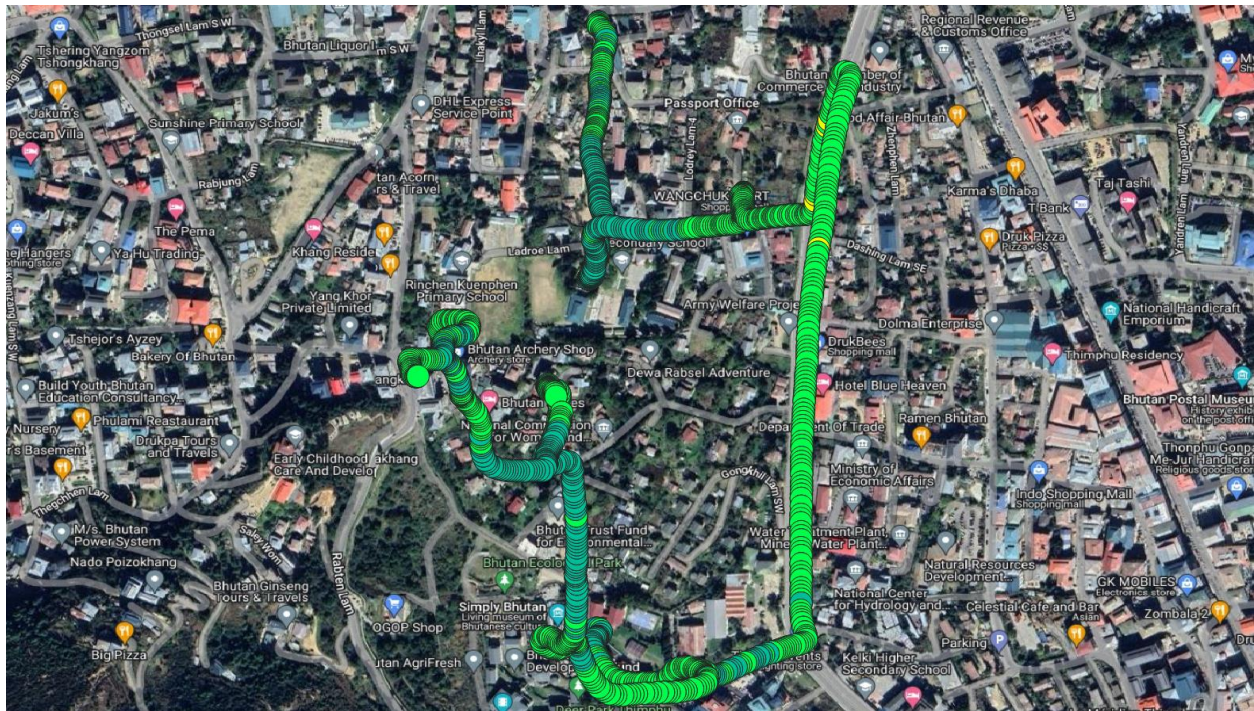
Figure number 27.2: RSRP plot 4G Tashi cell (QGIS) [Changangkha (Housing,CMSS and RKPS)]

28. Lower Motithang

● **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.79	6.6	No issue
TICL	0	4.03	6.82	No issue

● **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	28.01	16.63	No issue
TICL	29.16	22.69	No issue

Figure number 28.1: RSRP plot 4G B-mobile (QGIS) [Lower Motithang]

Figure number 28.2: RSRP plot 4G Tashi cell (QGIS) [Lower Motithang]

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29. Ministers' Colony (including the road above MHSS)

● **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.87	6.04	No issue
TICL	0	4.03	6.61	No issue

● **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	28.82	21.25	No issue
TICL	34.58	22.44	No issue

Figure number 29.1: RSRP plot 4G B-mobile (QGIS) [Ministers' Colony (including the road above MHSS)]

Figure number 29.2: RSRP plot 4G Tashi cell (QGIS) [Ministers' Colony (including the road above MHSS)]

30. MoIC (including ministry areas, BTL and Kawajangsa)

● *Mobile Voice Service*

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.86	6.04	No issue
TICL	0	4	7.59	No issue

● *Data Throughputs (Mbps) (4G)*

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	24.02	34.38	No issue
TICL	29.13	18.55	No issue

Figure number 30.1: RSRP plot 4G B-mobile (QGIS) [MoIC (including ministry areas, BTL and Kawajangsa)]

Figure number 30.2: RSRP plot 4G Tashi cell (QGIS) [MoIC (including ministry areas, BTL and Kawajangsa)]

31. Sangaygang (RITH, Motithang Takin Preserve)

- **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.82	6.27	No issue
TICL	0	3.61	7.86	No issue

- **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	24.14	16.34	No issue
TICL	34.46	13.17	No issue

Figure number 31.1: RSRP plot 4G B-mobile (QGIS) [Sangaygang (RITH, Motithang Takin Preserve)]

Figure number 31.2: RSRP plot 4G Tashi cell (QGIS) [Sangaygang (RITH, Motithang Takin Preserve)]

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32. Upper Motithang

● **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.89	6.01	No issue
TICL	0	3.62	7.91	No issue

● **Data Throughputs (Mbps) (4G)**

Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	41.58	30.89	No issue
TICL	45.64	28.24	No issue

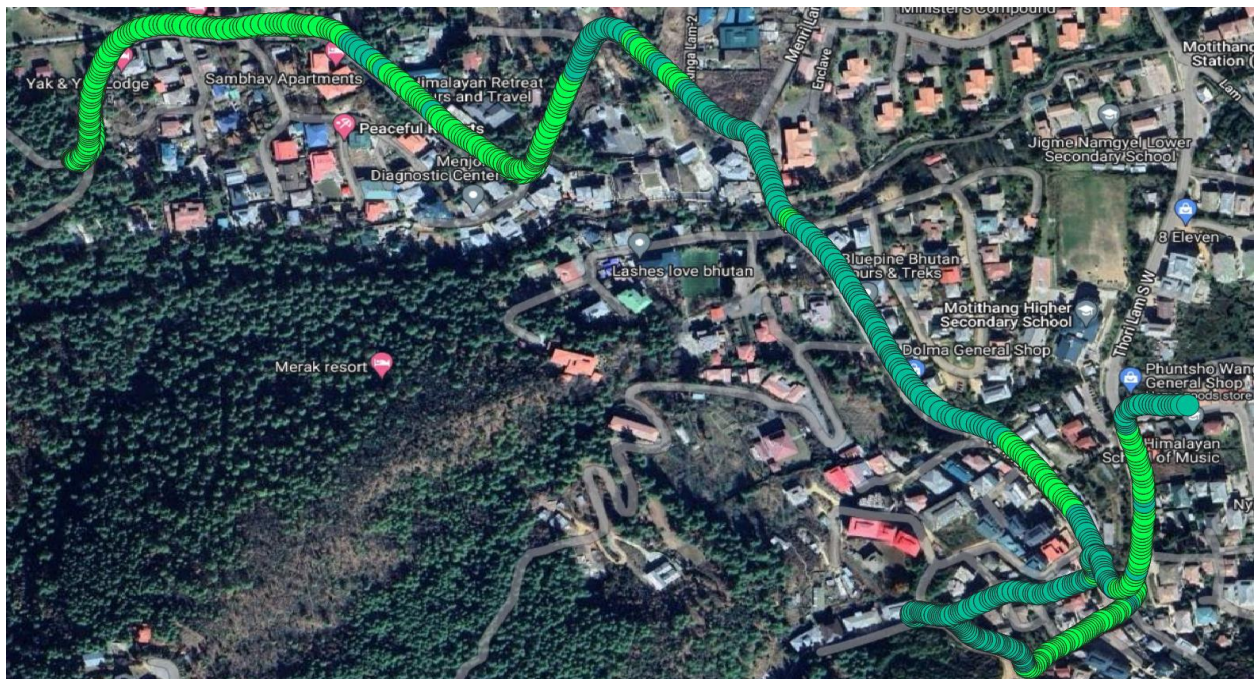*Figure number 31.1: RSRP plot 4G B-mobile (QGIS) [NPPF Colony]*

Figure number 31.2: RSRP plot 4G Tashi cell (QGIS) [NPPF Colony]

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33. Zilukha - Motithang Highway

- **Mobile Voice Service**

Operator	Call Drop rate (<2%)	Mean Opinion Score (>= 3.5)	Call Fallback Setup Time (<= 9 Seconds)	Remarks
BTL	0	3.85	6.89	No issue
TICL	0	3.96	10.05	Issue with CFBST

- **Data Throughputs (Mbps) (4G)**

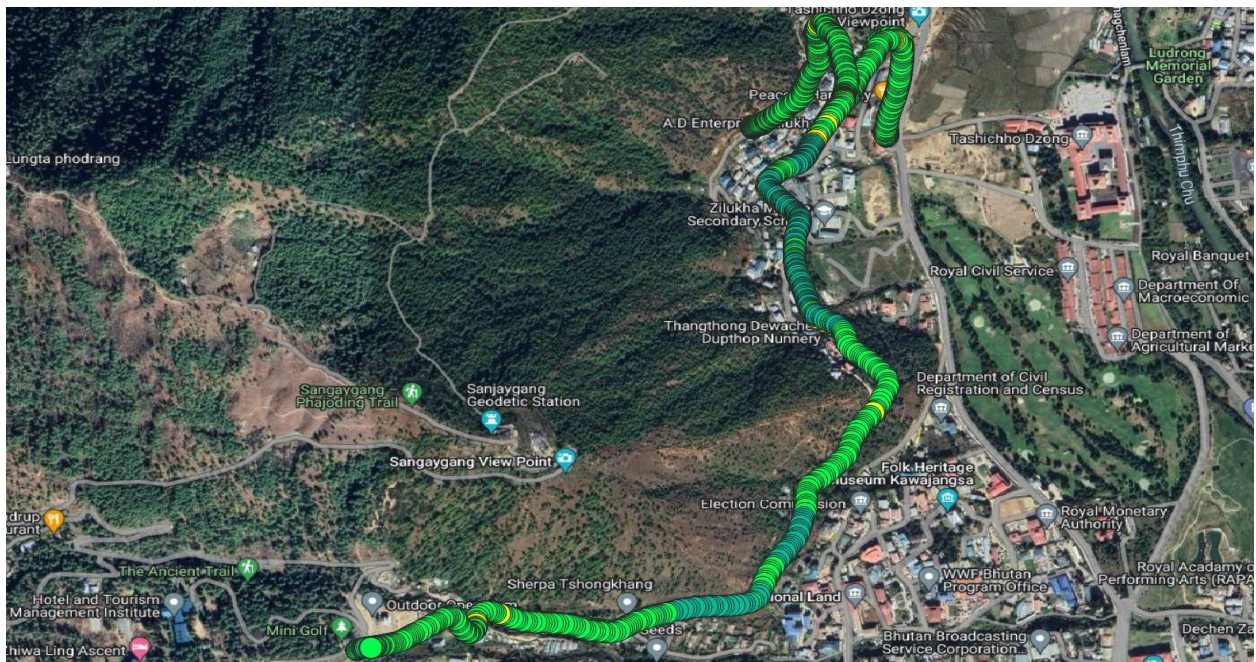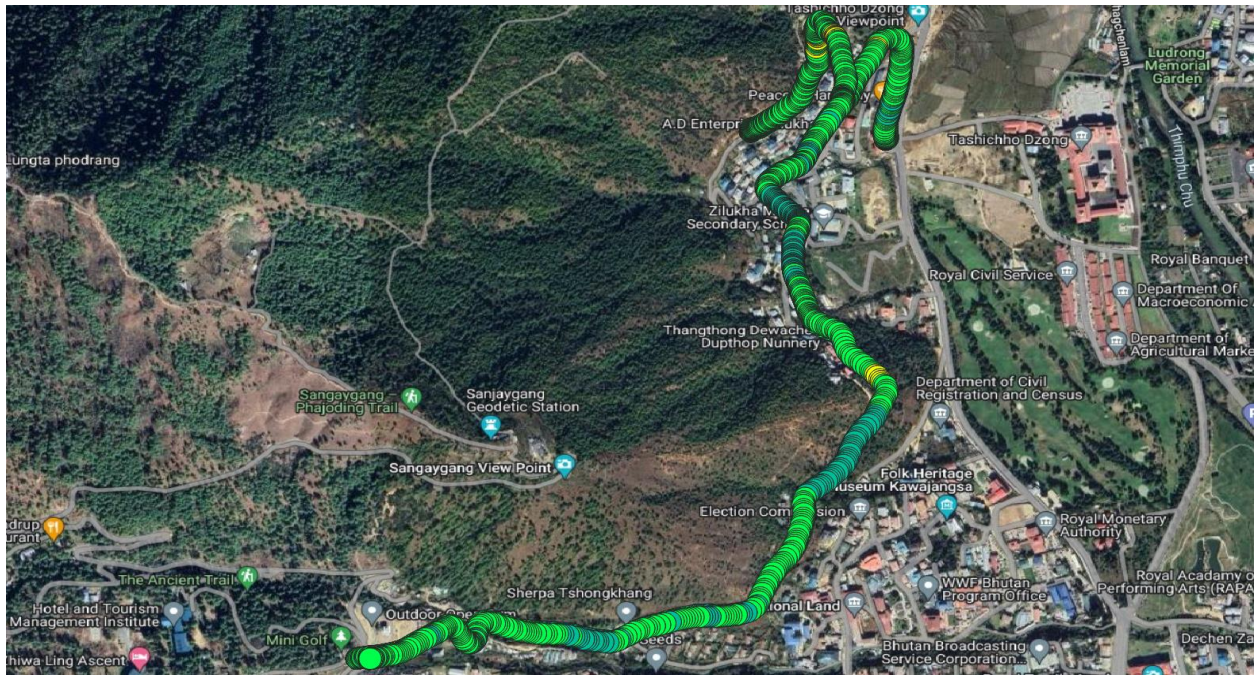| Operators	File Transfer Protocol		Remarks
	Download (≥ 6 Mbps)	Upload (≥ 2 Mbps)	
BTL	23.29	21.04	No issue
TICL	15.71	15.64	No issue

Figure number 26.1: RSRP plot 4G B-mobile (QGIS) [Zilukha - Motithang Highway]

Figure number 26.2: RSRP plot 4G Tashi cell (QGIS) [Zilukha - Motithang Highway]

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C. Findings

1. It is found that 4G data throughputs of both the operators in the monitored areas are meeting the standards except for the following places:

TICL	BTL
Upper Pamtsho 1 (Download)	Hejo (Download)
YHSS area (Download)	YHSS area (Download)

2. The call fallback setup time for both the operators in all the monitored places are meeting the standards except for the following places:

TICL	BTL
Bhutan kitchen and Village Restaurant area	Old Highway Babesa
Upper Pamtsho 1	
Lower Taba	
YHSS area	
Zilukha - Motithang Highway	

3. The Mean Opinion Score for both the operators in all the monitored places are meeting the standards except for *Upper Pamtsho 1* for BTL.

4. There are no issues of Call drop for both the operators, at all monitored places.