Report on the Mobile Quality of Services (October -December, 2019)

འབྲུག་བརྡ་དོན་བརྒྱུད་འཕེལ་དང་བརྡ་བརྒྱུད་དབང་འཛིན།
Bhutan InfoComm and Media Authority
Royal Government of Bhutan

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1. Locations And Months

Sl.No	Locations	Months
1	Taba(Thimphu)	October
2	Samdrup Jongkhar	November
3	Babesa Express Way(Thimphu)	
4	Wangdue Phodrang	December
5	Punakha	

2. Drive Test results

2.1. Taba (Thimphu)__October

2.1.1. Mobile Voice Services

a. 3G

Operators	Call-Drop Rate (<2%)	Call-Setup Time (<6.5sec)	Mean Opinion Score	Latency (<120ms)
TashiCell	0	7.20	3.34	16.8
B-Mobile	0	9.21	3.39	13.3

b. 4G

	Call-Drop Rate (<2%)	Call-Setup Time(<6.5sec)	Mean Opinion Score	Latency(<60ms)
TashiCell	0	9.65	3.3	16.1
B-Mobile	0	9.89	3.3	15

2.1.2 Mobile Data services

2.1.2.1 Data Completion Rate (%)

a. 3G

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	Download	Upload	Download
TashiCell	100	100	88.89	100
B-Mobile	100	0	0	71.43

b. 4G

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	Download	Upload	Download
TashiCell	93.75	100	100	100
B-Mobile	100	27.57	100	100

2.1.2.2 Data Throughput (Mbps)

a. 3G

Operators	File Transfer Protocol Test (FTP) (≥1.5Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥1.5Mbps)	
	Upload Data Throughput	Download Data Throughput	Upload Data Throughput	Download Data Throughput
TashiCell	1.65	4.33	1.43	3.88
B-Mobile	0.63	0	0	2.85

b. 4G

Operators	File Transfer Protocol Test (FTP) (≥6Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥6Mbps)	
	Upload Data Throughput	Download Data Throughput	Upload Data Throughput	Download Data Throughput
TashiCell	1.87	2.25	11.27	12.63
B-Mobile	2.03	2.24	16.11	26.36

2.2 Samdrup Jongkhar_November

The KPI drive test in Samdrup Jongkhar was carried out twice .The results below is the average of two readings.

2.2.1 Mobile Voice Services

a. 3G

	Call-Drop Rate (<2%)	Call-Setup Time(<6.5sec)	Mean Opinion Score	Latency(<120ms)
TashiCell	0	7.67	2.87	18
B-Mobile	0	8.04	3.31	13

b. 4G

	Call-Drop Rate (<2%)	Call-Setup Time(<6.5sec)	Mean Opinion Score	Latency(<60ms)
TashiCell	0	15.17	3.09	18
B-Mobile	0	10.87	3.13	22

2.2.2 Mobile Data Services

2.2.2.1 Data Completion Rate (%)

a. 3G

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	Download	Upload	Download
TashiCell	97.22	100	100	100
B-Mobile	95.46	77.28	100	85

b. 4G

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	**Download**	**Upload**	**Download**
TashiCell	100	100	100	100
B-Mobile	95.46	9.09	95.46	95.46

2.2.2.2 Data Throughput (Mbps)

a. 3G

Operators	File Transfer Protocol Test (FTP) (≥1.5Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥1.5Mbps)	
	Upload Data Throughput	**Download Data Throughput**	**Upload Data Throughput**	**Download Data Throughput**
TashiCell	1.31	3.33	1.27	3.49
B-Mobile	0.79	1.67	0.76	3.31

b. 4G

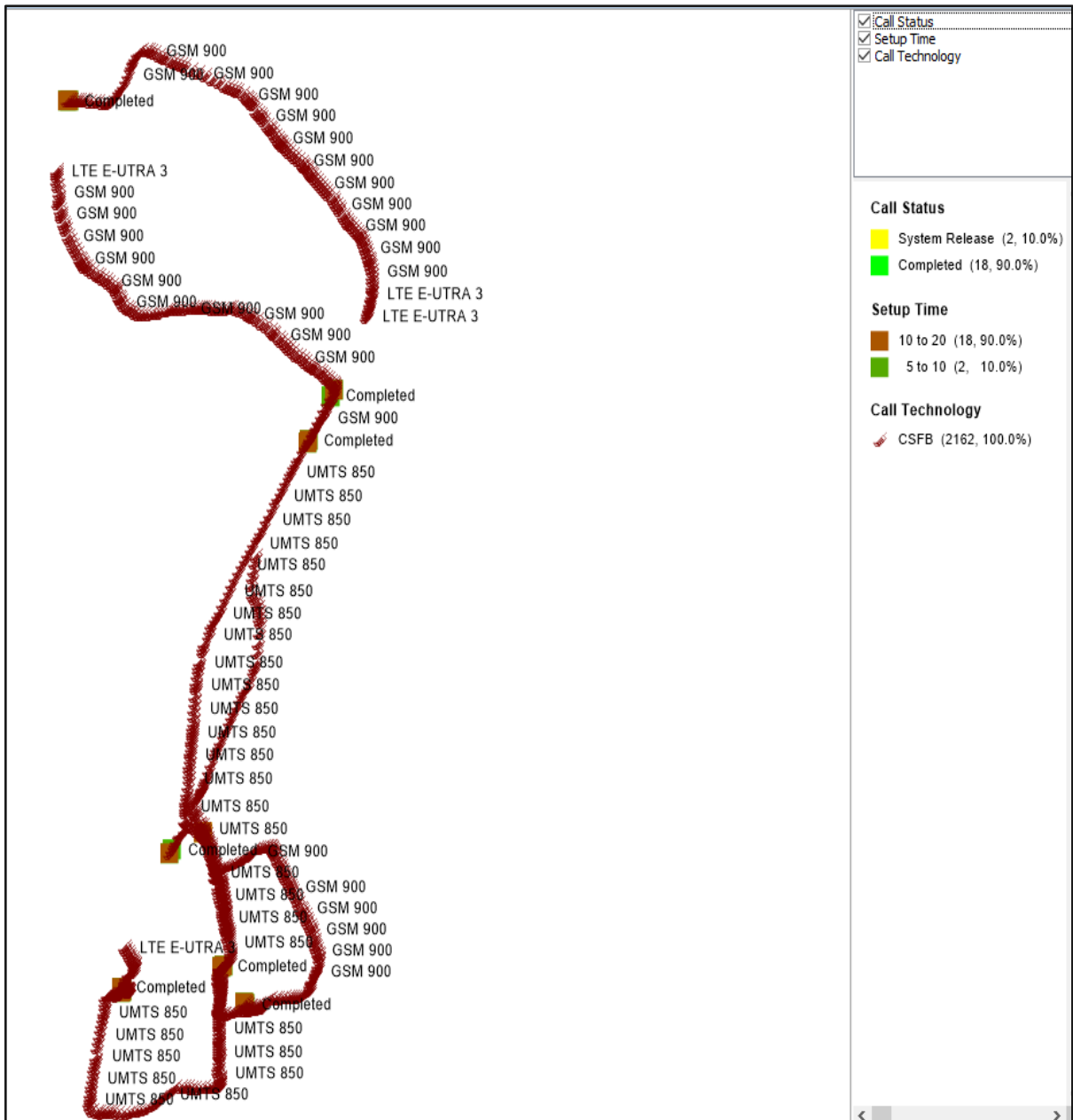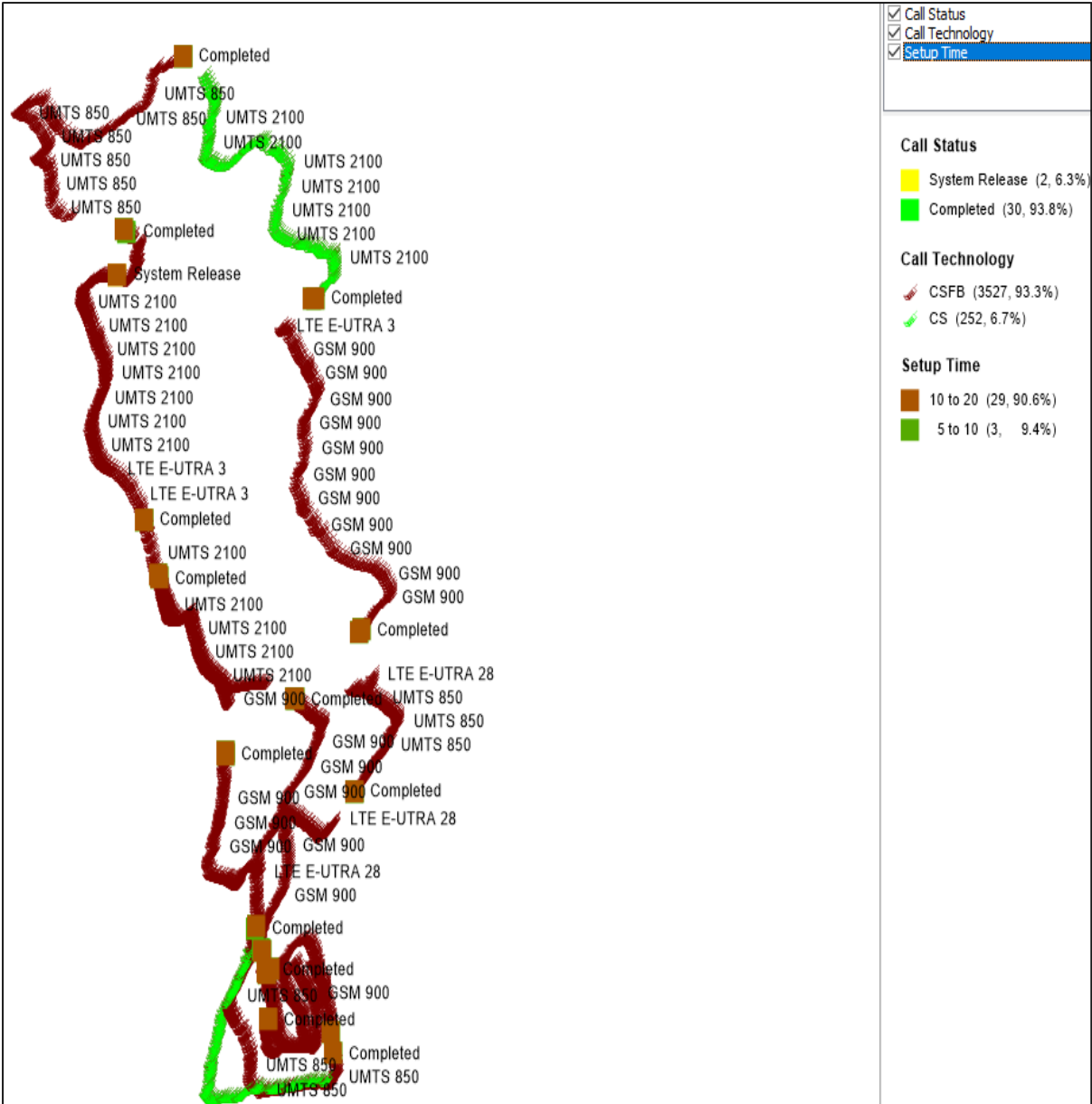|	File Transfer Protocol Test (FTP) (≥6Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥6Mbps)	
	Upload Data Throughput	**Download Data Throughput**	**Upload Data Throughput**	**Download Data Throughput**
TashiCell	11.81	11.28	13.33	11.72
B-Mobile	14.09	3.72	17.84	38.42

Figure 1: Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 4G_1 Network (Samdrup Jongkhar)

Registration Status
Transferred Data [kByte]
Transferred Data [kByte]
Data Technology

Registration Status

   Home network (384, 100.0%

Transferred Data [kByte]

   10000 to 100000 (35, 100.0

Transferred Data [kByte]

   10000 to 100000 (34, 100.0
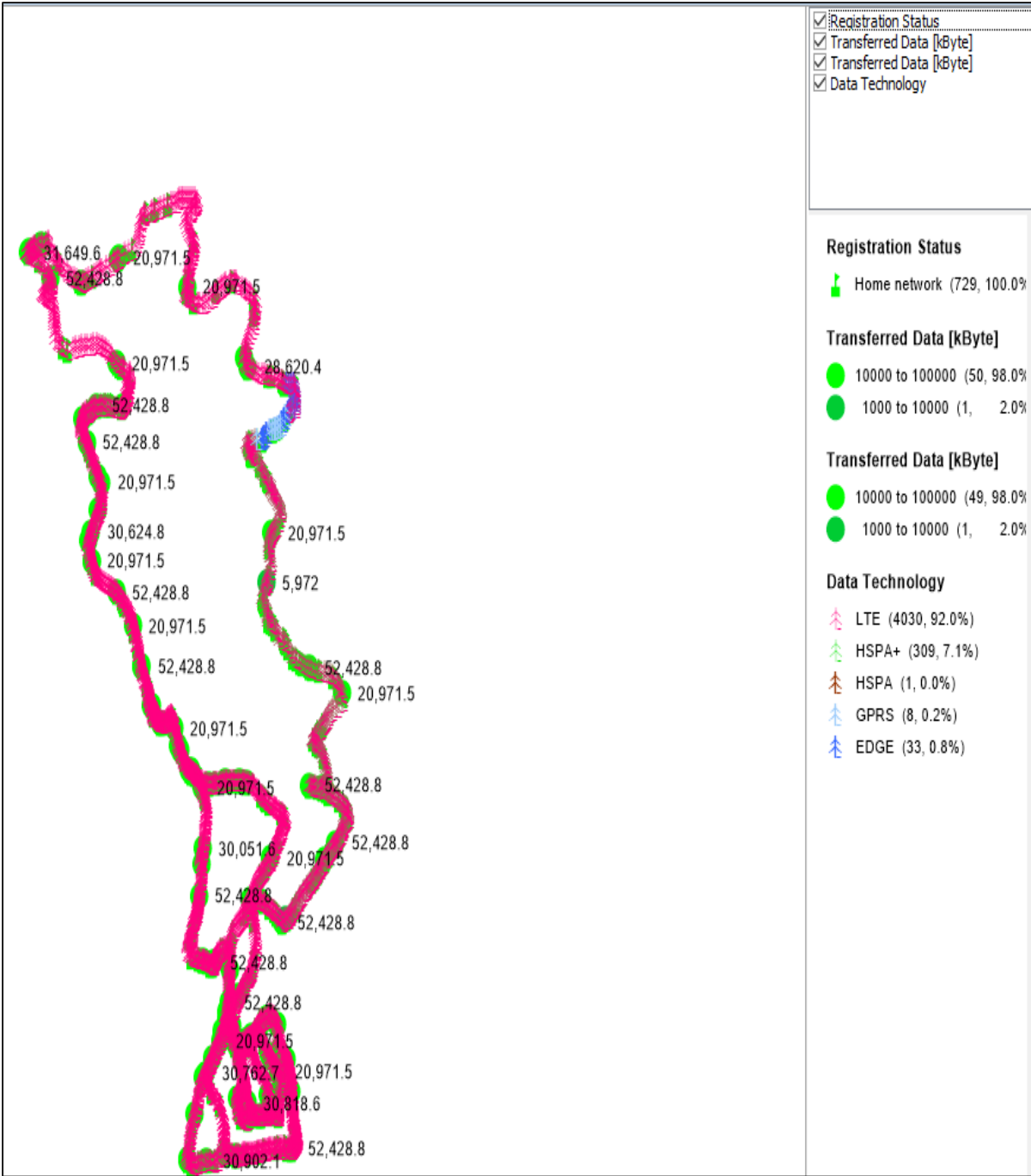
Data Technology

   LTE (2529, 100.0%)

Figure 2:Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 4G_1 network (Samdrup Jongkhar)

Figure 3: Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 4G_2 Network (Samdrup Jongkhar)
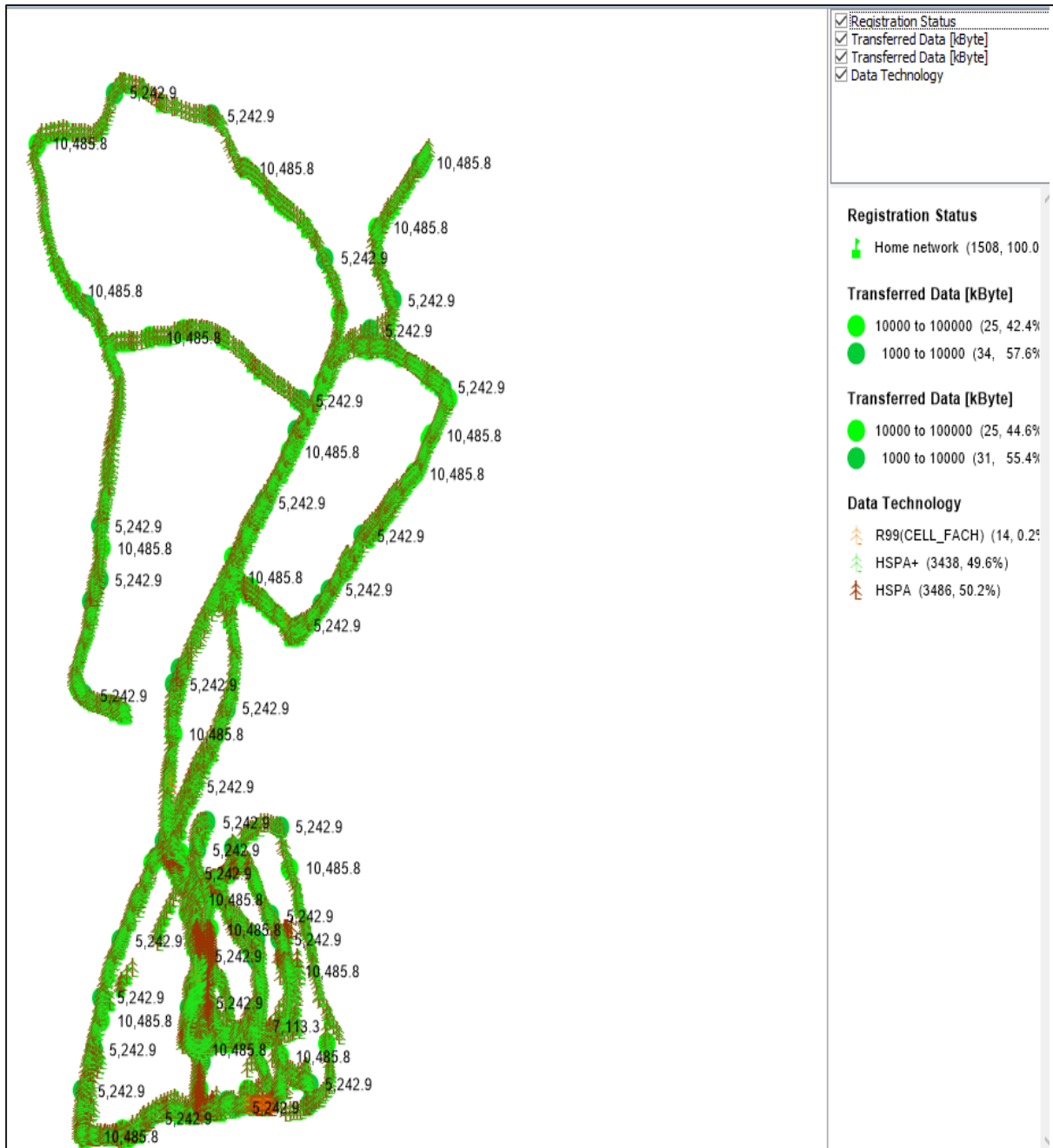
Figure 4: Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 4G_2 network (Samdrup Jongkhar)

Figure 5:Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 3G_1 Network(Samdrup Jongkhar)

Figure 6: Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 3G_1 network (Samdrup Jongkhar)

Figure 7:Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 3G_2 network (Samdrup Jongkhar)
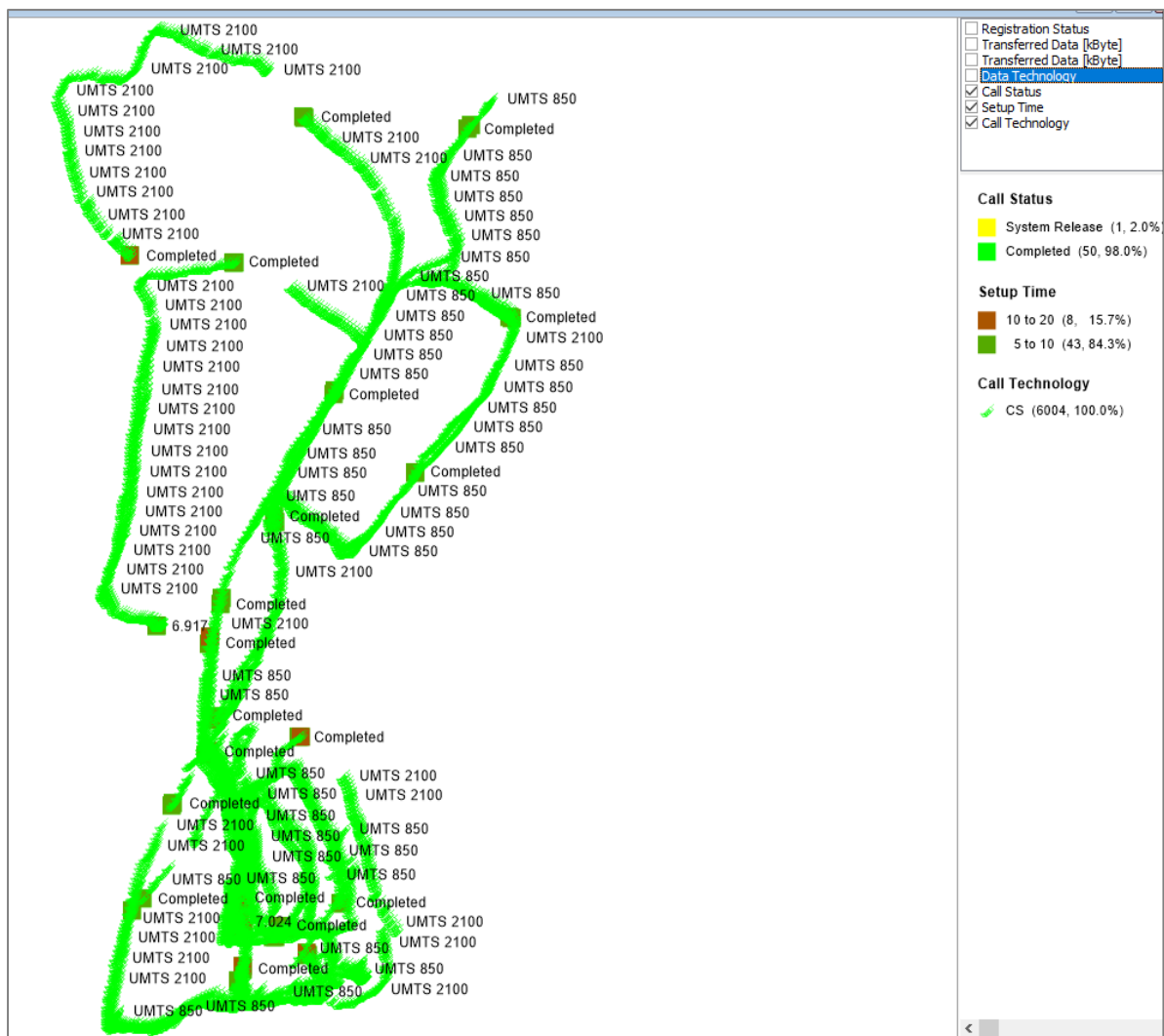
Figure 8: Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 3G_2 Network(Samdrup Jongkhar)

2.3 Babesa Expressway-December

2.3.1 Mobile Voice Services

a. 3G

Operators	Call-Drop Rate (<2%)	Call-Setup Time (<6.5Sec)	Mean Opinion Score	Latency(<120ms)
TashiCell	2.7	6.95	3.36	16.9
B-Mobile	0	7.93	3.24	13.9

b. 4G

	Call-Drop Rate (<2%)	Call-Setup Time(<6.5Sec)	Mean Opinion Score	Latency(<60ms)
TashiCell	0	10.06	3.26	16.8
B-Mobile	0	8.84	3.20	21.9

2.3.2 Mobile Data services

2.3.2.1 Data Completion Rate (%)

a. **3G**

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	**Download**	**Upload**	**Download**
TashiCell	71.43%	57.14%	100	100
B-Mobile	100	100	50	71.43

b. **4G**

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	**Download**	**Upload**	**Download**
TashiCell	100	100	100	100
B-Mobile	100	6.25%	100	100

2.3.2.2 Data Throughput (Mbps)
a. **3G**

Operators	File Transfer Protocol Test (FTP) (≥1.5Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥1.5Mbps)	
	Upload Data Throughput	**Download Data Throughput**	**Upload Data Throughput**	**Download Data Throughput**
TashiCell	0.97	3.28	1.07	4.05
B-Mobile	0.95	1.81	0.78	2.69

b. **4G**

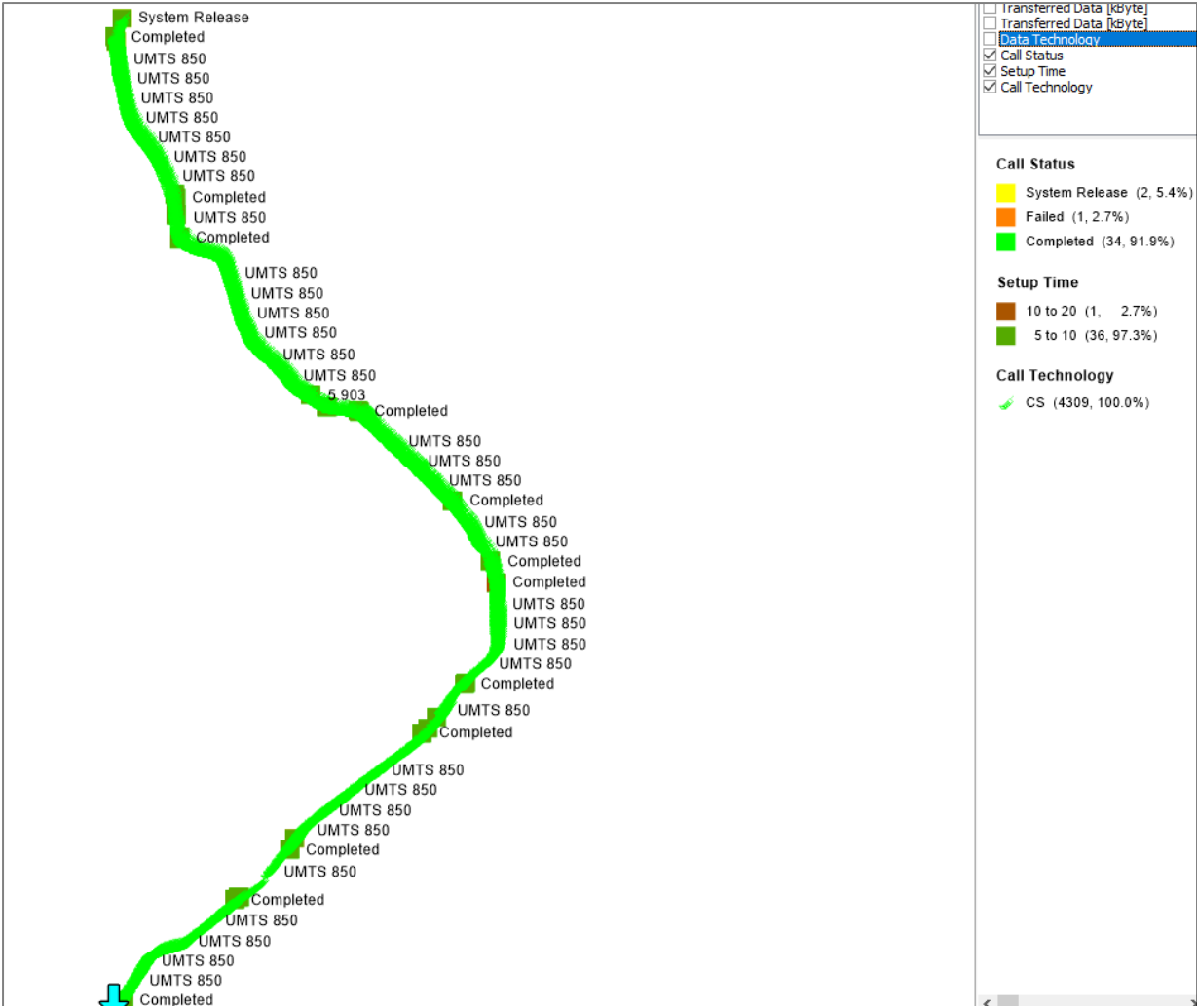| Operators	File Transfer Protocol Test (FTP) (≥6Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥6Mbps)	
	Upload Data Throughput	**Download Data Throughput**	**Upload Data Throughput**	**Download Data Throughput**
TashiCell	12.17	10.19	12.25	11.18
B-Mobile	14.91	8.68	15.84	23.94

Figure 9: Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 3G Network(Babesa Expressway)
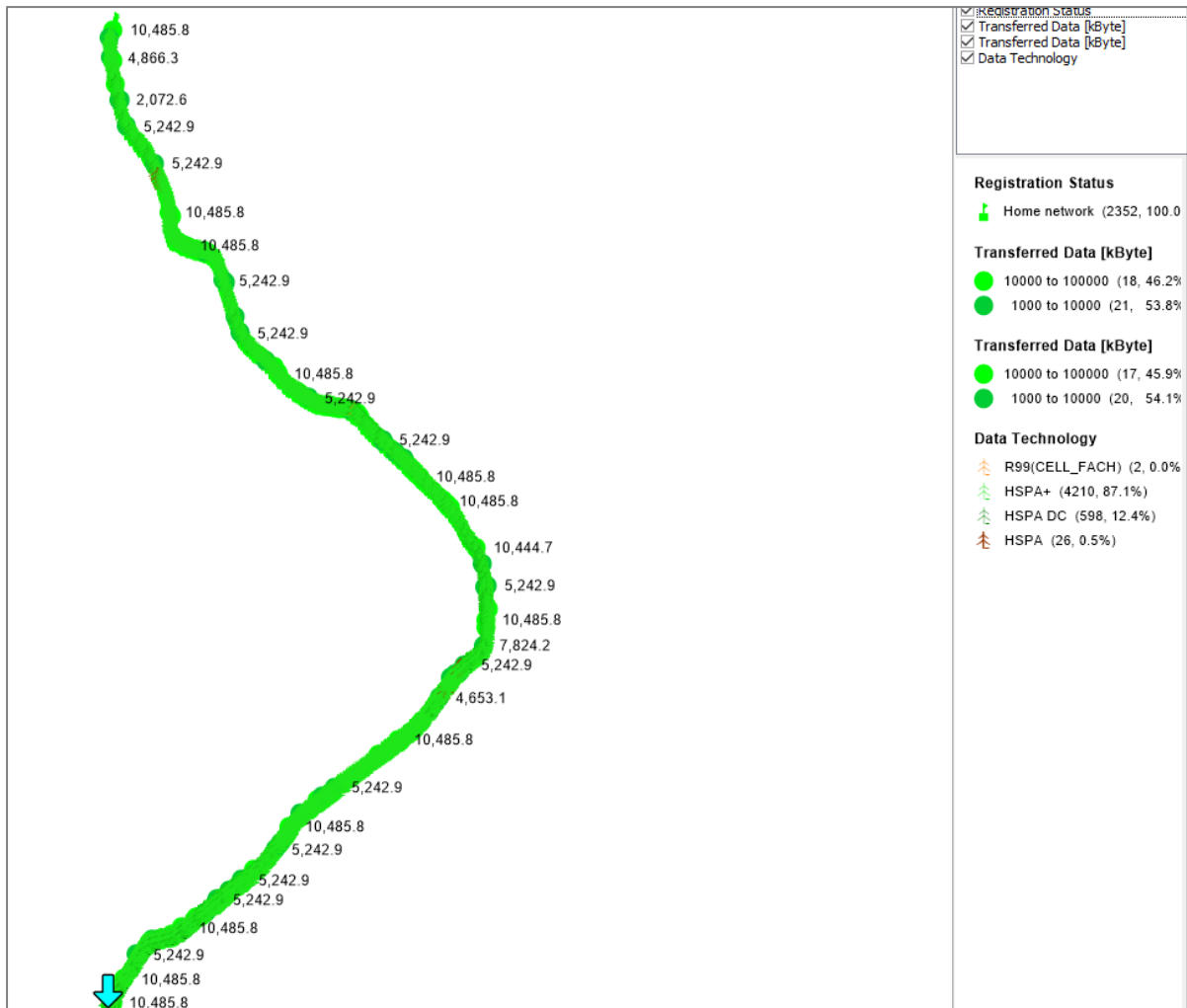
Figure 10: Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 3G network(Babesa Expressway)
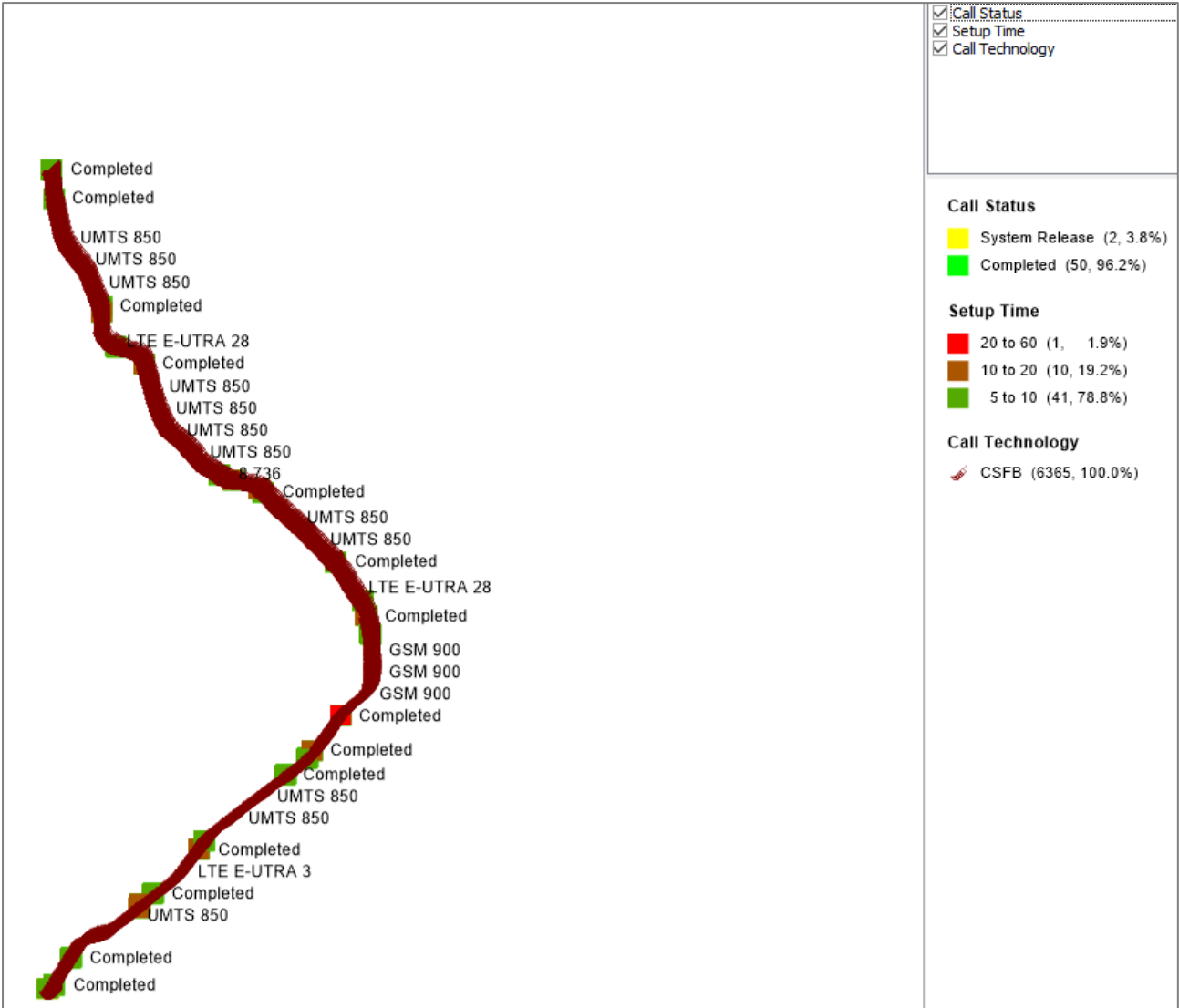
Figure 11: Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 4G Network(Babesa Expressway)

Figure 12: Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 4G network(Babesa Expressway)

2.4 Wangdue Phodrang_ December

2.4.1 Mobile Voice Services

a. 3G

Operators	Call-Drop Rate (<2%)	Call-Setup Time (<6.5Sec)	Mean Opinion Score	Latency(<120ms)
TashiCell	0	8.36	3.36	34.0
B-Mobile	0	7.39	3.24	13.8

b. 4G

	Call-Drop Rate (<2%)	Call-Setup Time(<6.5Sec)	Mean Opinion Score	Latency(<60ms)
TashiCell	0	10.06	3.26	21.5
B-Mobile	0	8.84	3.20	15.4

2.4.2 Mobile Data services

2.4.2.1 Data Completion Rate (%)

a. 3G

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	Download	Upload	Download
TashiCell	87.50	50	85.71%	75.00%
B-Mobile	16.67	100	16.67%	83.33%

b. 4G

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	Download	Upload	Download
TashiCell	0	50	100	50
B-Mobile	100	0	100	85

2.4.2.2 Data Throughput (Mbps)

a. 3G

Operators	File Transfer Protocol Test (FTP) (≥1.5Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥1.5Mbps)	
	Upload Data Throughput	Download Data Throughput	Upload Data Throughput	Download Data Throughput
TashiCell	0.8	1.59	0.79	1.68
B-Mobile	0.49	1.15	0.69	1.36

b. 4G

Operators	File Transfer Protocol Test (FTP) (≥6Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥6Mbps)	
	Upload Data Throughput	Download Data Throughput	Upload Data Throughput	Download Data Throughput
TashiCell	0	9.67	1.59	10.78
B-Mobile	11.87	0	15.31	24.7

Figure 13: Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 3G Network(Wangdue Phodrang)

Figure 14:Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 3G network(Wangdue Phodrang)
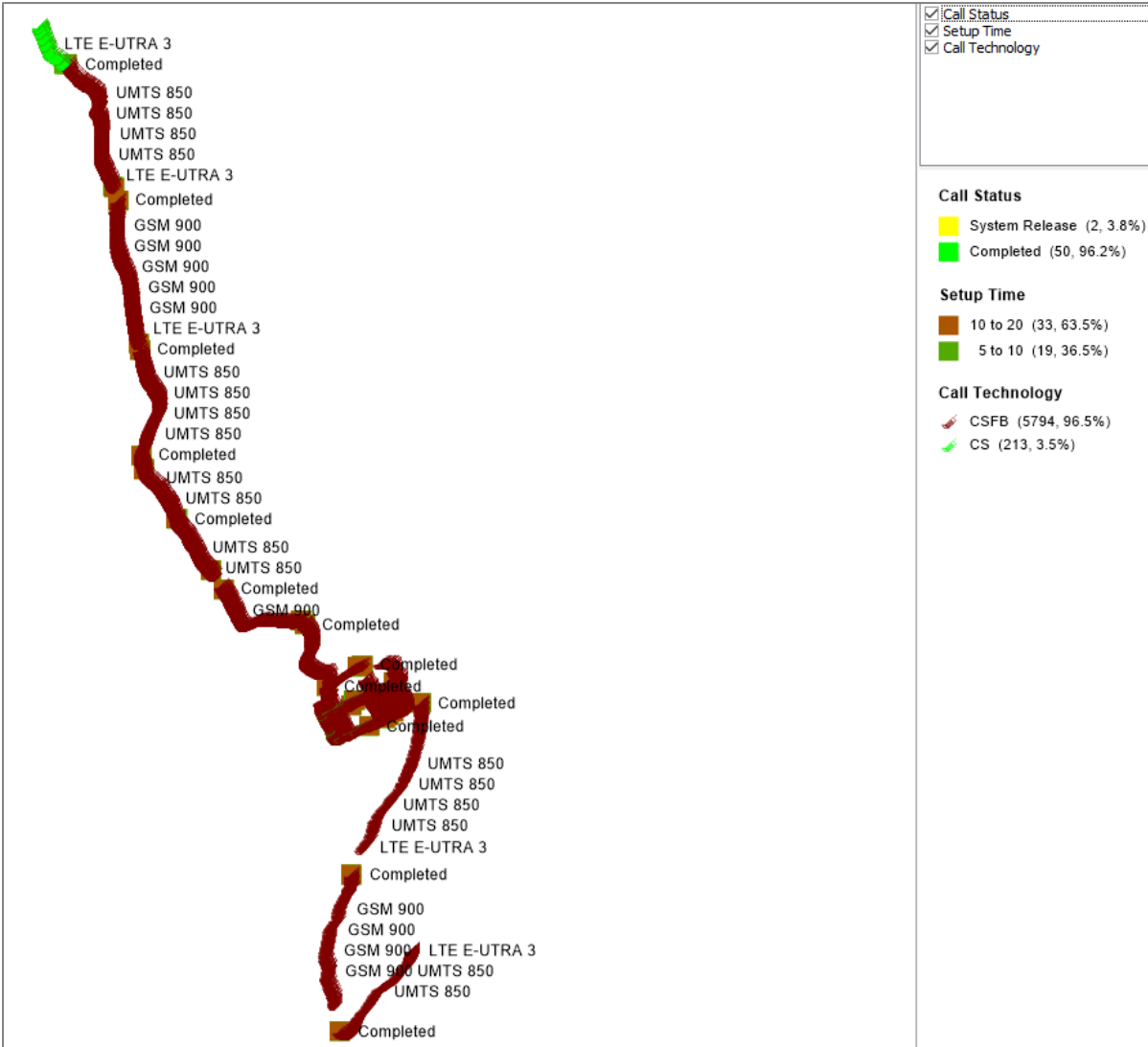
Figure 15: Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 4G Network(Wangdue Phodrang)
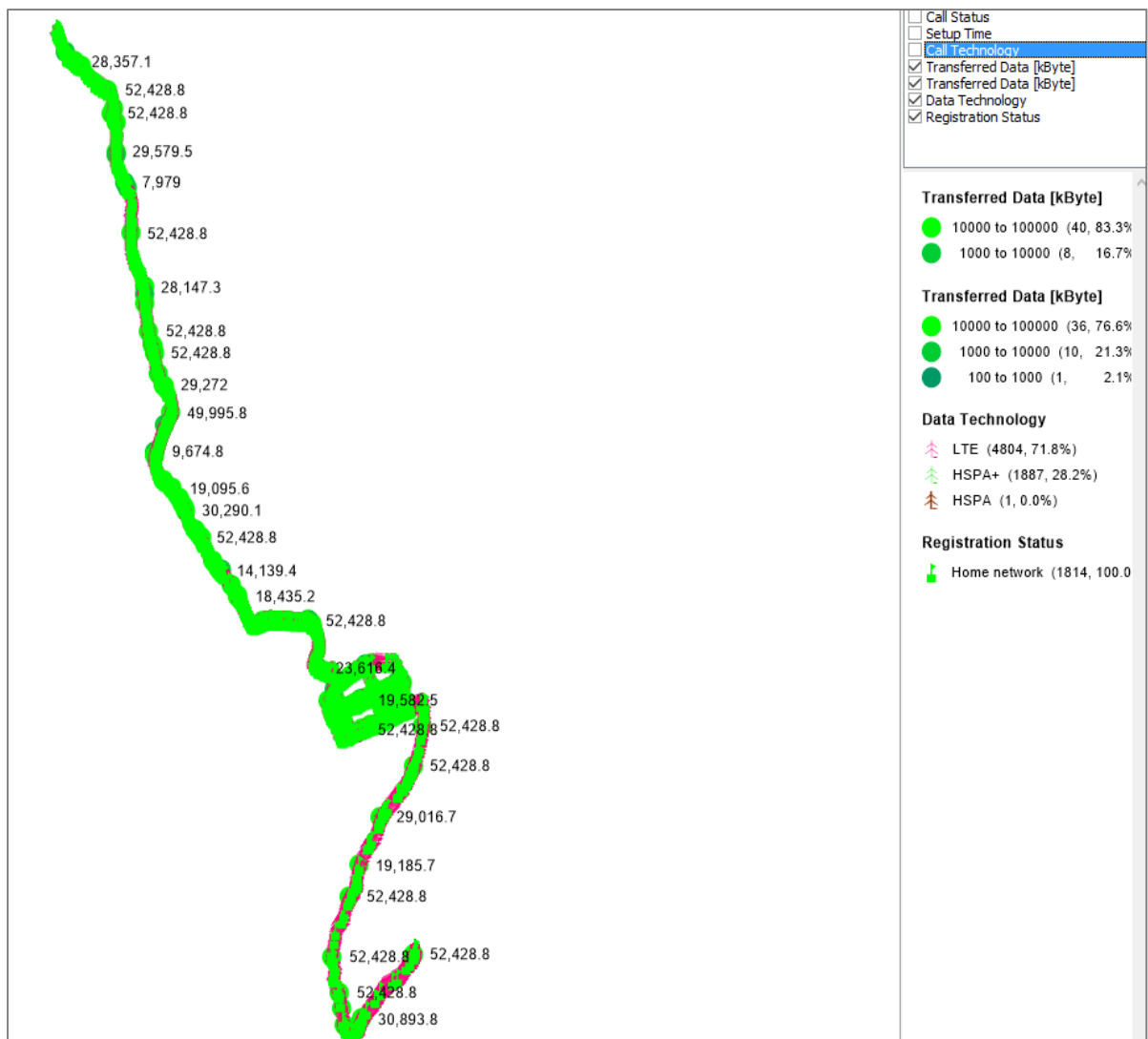
Figure 16:Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 4G network(Wangdue Phodrang)

2.5 Punakha - December

2.5.1   Mobile Voice Services

a. **3G**

Operators	Call-Drop Rate (<2%)	Call-Setup Time (<6.5Sec)	Mean Opinion Score	Latency (<120ms)
TashiCell	9.09	12.98	2.42	61.0
B-Mobile	0	7.95	3.32	13.1

b. **4G**

	Call-Drop Rate (<2%)	Call-Setup Time(<6.5sec)	Mean Opinion Score	Latency(<60ms)
TashiCell	0	15.20	3.02	14.9
B-Mobile	0	10.04	3.23	19.1

2.5.2 Mobile Data services

2.5.2.1 Data Completion Rate (%)

a. **3G**

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	Download	Upload	Download
TashiCell	100	28.57	16.67	28.57
B-Mobile	100	15.38	25	16.67

b. **4G**

Operators	File Transfer Protocol		Hyper Text Transfer Protocol	
	Upload	Download	Upload	Download
TashiCell	90.00	90.91	100	100
B-Mobile	13.33	0	100	33.33%

2.5.2.2 Data Throughput (Mbps)

a. **3G**

Operators	File Transfer Protocol Test (FTP) (≥1.5Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥1.5Mbps)	
	Upload Data Throughput	Download Data Throughput	Upload Data Throughput	Download Data Throughput
TashiCell	0.26	1.39	0.5	1.14
B-Mobile	0.11	1.93	0.54	1.35

b. **4G**

Operators	File Transfer Protocol Test (FTP) (≥6Mbps)		Hyper Text Transfer Protocol Test (HTTP) (≥6Mbps)	
	Upload Data Throughput	Download Data Throughput	Upload Data Throughput	Download Data Throughput
TashiCell	11.34	8.53	8.46	8.79
B-Mobile	11.97	0	13.69	27.78

Figure 17: Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 3G Network(Punakha)
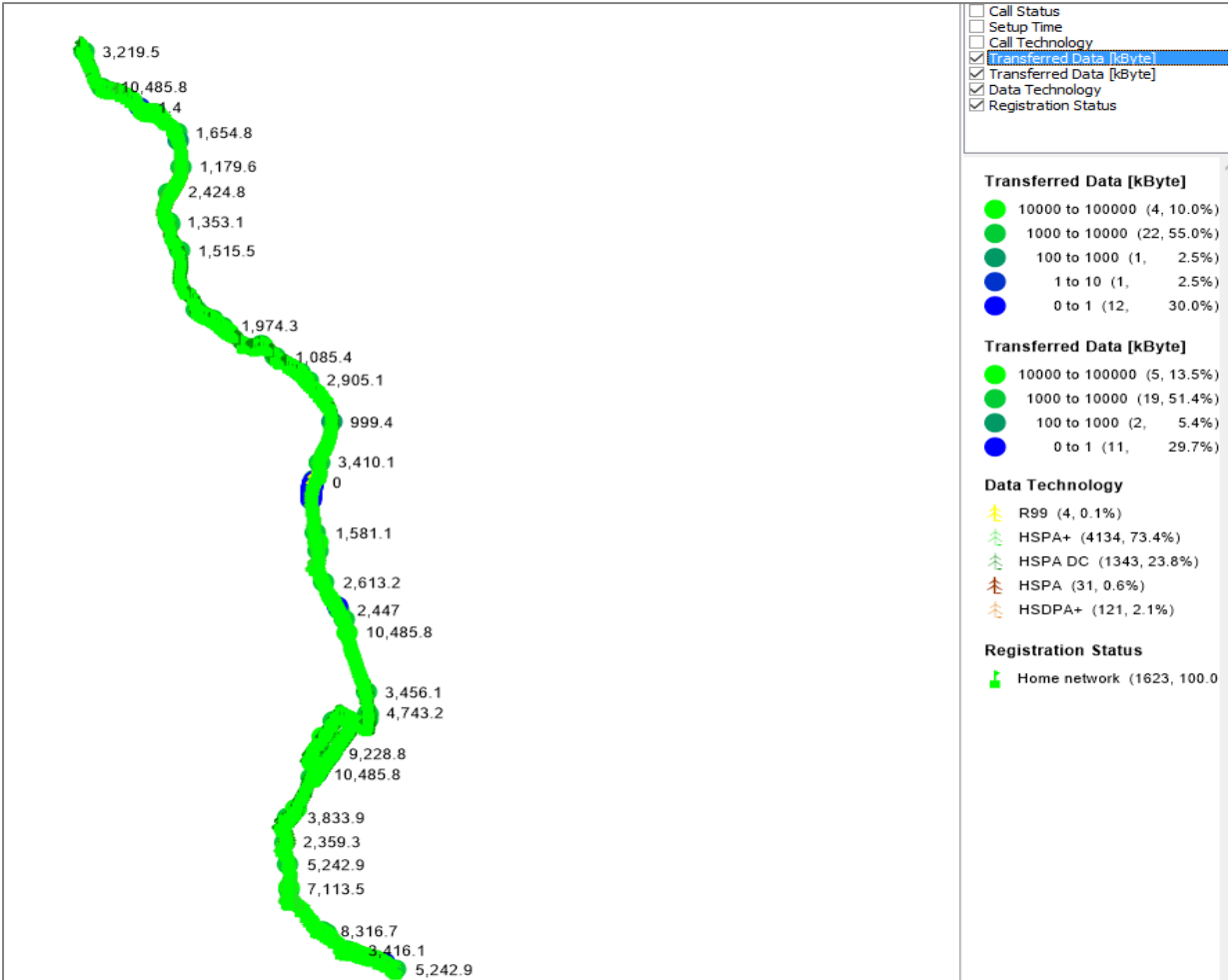
Figure 18: Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 3G network(Punakha)
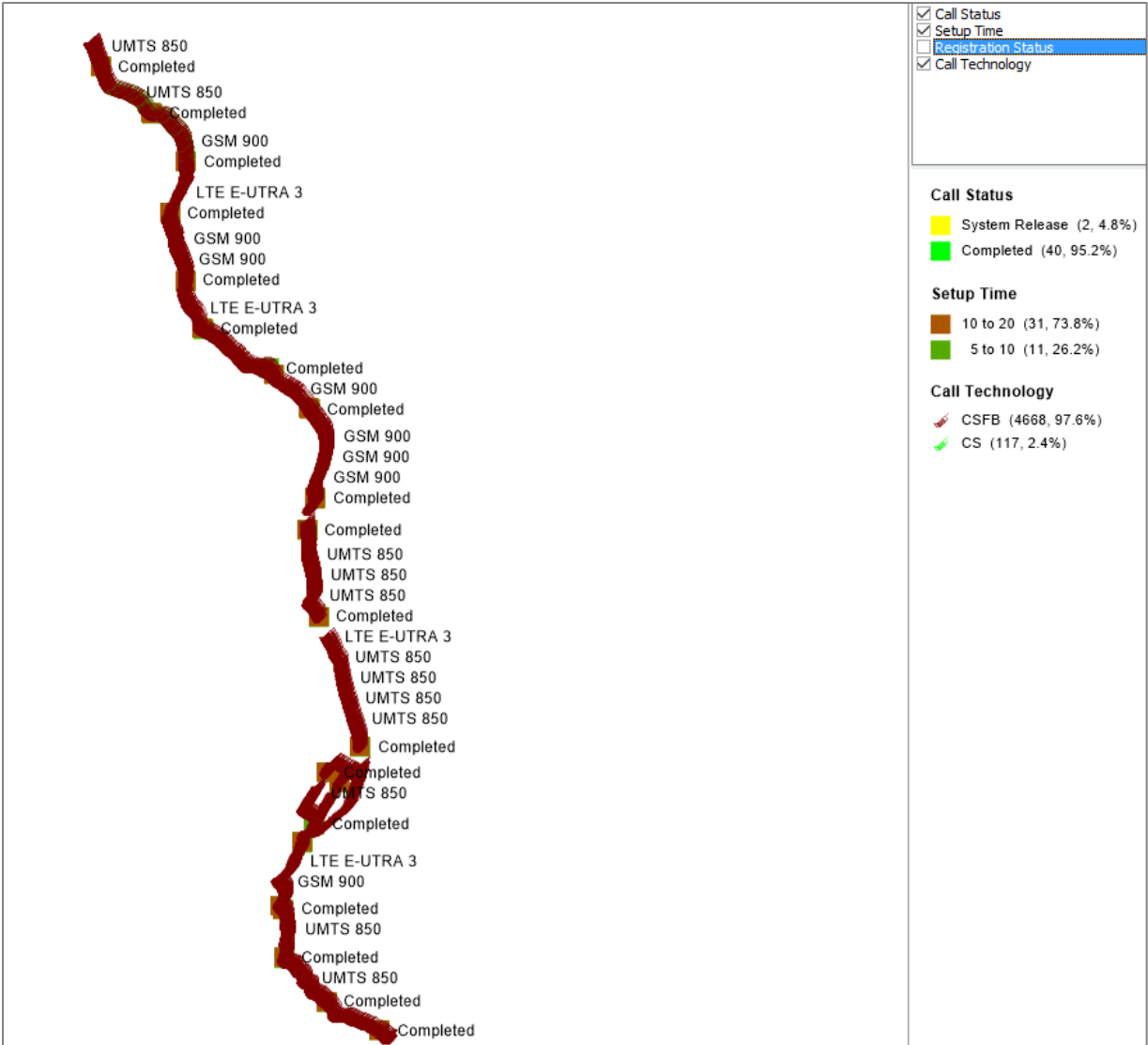
Figure 19:Map of Call Set-Up Time, Call Status and Call Technology of Bmobile and TashiCell for 4G Network(Punakha)
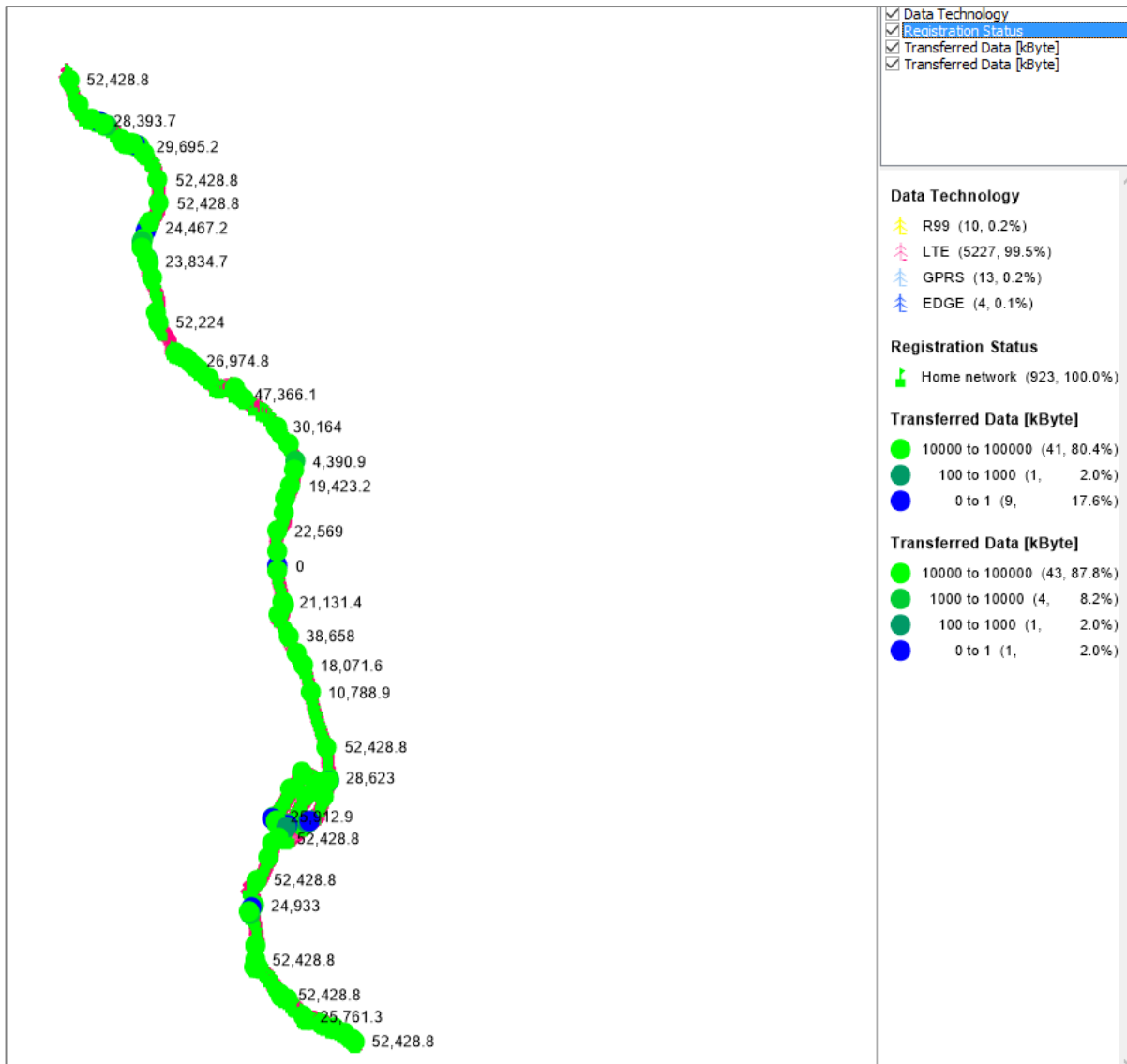
Figure 20: Map of Registration Status, Transferred Data (FTP/HTTP) and Data Technology for Bmobile and TashiCell for 4G network(Punakha)