Quarterly Report on EMF Monitoring

(January - March 2025)

Bhutan InfoComm and Media Authority

Royal Government of Bhutan

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1. Background

Electromagnetic Field (EMF) Emissions are the electric and magnetic fields that are produced by radios, microwaves, mobile phones and base stations (mobile towers). Telecommunications transmitters generate electromagnetic fields at radio and microwave frequencies. Transmitters have proliferated with siting of wireless communication networks often co-located among other transmitters and the transmitter used in contact with human bodies. If the EMF exposure is prolonged there may be issues of possible health risks. Such risks must be managed and prevented. Currently International Commission on Non-Ionizing Radiation Protection (ICNIRP) standards and various other standards are adopted on the assessment and compliance of the exposure levels radiated from different electromagnetic spectrum sources according to the permissible levels in order to protect the people from exposure to higher RF radiations. The most sources of exposure include the cellular network using GSM, WCDMA, LTE and others which occupy the VHF, UHF, L and S band frequencies.

The Bhutan InfoComm and Media Authority have always been monitoring and measuring the EMF radiation level of each Telecommunication Base Transceiver station (towers) in the country based on the EMF emission standards. The Authority also certifies the EMF compliance of the mobile towers in the country mainly in urban areas and satellite towns areas.

The EMF emission standard is derived from the EMF radiation threshold developed by ICNIRP and the Authority has standardized the threshold level of EMF radiation exposure based on the regional threshold.

2. Monitoring

The Authority has monitored the EMF from January to March, 2025 in following places;

Sl.No	Name of the Monitored Places	Number of tower Monitored
1	Lungtenphu	2
2	Olakha	5
3	Babesa	11

The Authority will continue to monitor and measure the mobile towers in the country and will be issued with the certificate of EMF threshold compliance respectively.

3. Objective of the Monitoring

The main objective of the EMF measurement monitoring is:

- To ensure the safe and reliable communication services.

- To test the exposure levels produced by any transmitter or emitter such as telecommunication facilities and mobile telephone base stations for safety purposes and maintain the EMF emission within the standard threshold.
- To ensure that all telecommunication equipment is safe and secure.

4. Details of the Equipment used for EMF Compliance Test

The details of existing EMF monitoring equipment of the Authority are as mentioned below:

Equipment Make/Model:	Narda Safety test solution
Type of the Antenna:	Isotropic Antenna/Type (3-Axis), 420 MHz-6GHz
Spectrum Analyzer:	SRM3006 (9kHz-6GHz)
Calibration details:	Calibrated on 7-03-2024 and valid up to 2 to 3 years

5. Specification of the Equipment/ Instrument

The specification of the above equipment are as mentioned below:

- 3-axis, E-field antenna: 420 MHz to 6 GHz
- Spectrum analyzer SRM 3006: 9 kHz to 6GHz
- A 1.5 meter cable to separate the antenna from the meter
- Tripod to hold the antenna

Figure 1: EMF Monitoring

6. Measurement Parameter

The following quantities are measured while monitoring:

- Electric Field strength E in **V/m**

7. Methodology

The following methodology processes are followed while carrying out the monitoring:

- The measurement is done around 10 meters to 30 meters away from the sectoral antenna's BTS towers facing towards the measurement equipment which is based on the ICNIRP standards measurement.
- The measurement result is taken as the average/Max over a time period of 6 minutes.
- The measurement is done for 2G, 3G, 4G and 5G BTS Tower for both the telecom operators.
- Measurement values will be recorded and compare the measurement values with the reference level as per the international standard ICNIRP.
- Measurement is done through broadband measurement and if the exposure ratio is higher than the exposure ratio limits, the frequency selective measurement is recommended.

8. Reference Standards and Regulation/ICNIRP limits

According to Section 10(1), and 10(2) of the "Standard for the Establishment of Telecommunications Tower"

- 10 (1): *All telecommunication and broadcasting sites shall ensure compliance with the ICNIRP Procedures and Standards for general public exposure and take immediate actions to rectify any non-compliant Sites.*

- 10(2): *Antennas in all sites shall not emit the EMF radiation more than the standards shown in the table below*;

Frequency range	**Electric field-strength (V/m)**		**Equivalent plane wave power-density S_{eq}(W/m^2)**	
	general public	**occupational**	**general public**	**Occupational**
0.1 - 30 Hz	$300/(10^{0.5}*f^{0.7)}$ MHz)	$600/(10^{0.5}*f^{0.7}$MHz)	NA	NA
>30 – 400 MHz	$27.7/10^{0.5}$	$61/10^{0.5}$	0.2	1
>400 - 2000 MHz	$(1.375f^{0.5}$(MHz))$/10^{0.5}$	$(3f^{0.5}$ (MHz))$/10^{0.5}$	(f/2000)	(f/400)

>2 - 300 GHz	19.289	43.323	1	5

9. Findings and Permissible limits of Electric Field and Exposure Ratio

The EMF measurement of the BTS tower was carried out in **Lungtenphu, Olakha, and Babesha** town Area. It is found that the maximum exposures around all of the base stations are **very low** than exposure limits. The detailed measurement readings , findings, electric field and exposure ratio results are attached below in **Annexure 1** and screenshots of each measurement result are attached in **Annexure 2.**

10. Satellite View of the Measurement Location/Telecom site

The satellite view of the measurement location of each telecom site or transmitter is attached in **Annexure 3.**

Annexure 1 (Measurement Results)

The detailed measurement readings of Electric Field and Exposure Ratio are attached below;

1. Thimphu Thromde (Bhutan Telecom Limited)

Sl. No	Site Name	Latitude	Longitude	Frequency Band	Field Strength Measurement Value (V/m)	BICMA Limits V/m ($1.375f^{0.5}$(MHz))/$10^{0.5}$	Exposure Ratio SQRT (Measured V/Limit Value)^2	Exposure Ratio Limits	Remark
1	Lungtenphu (BTL1) (near helipad)	27°27'01.8'' N	89°39'23.9" E	LTE 1800	0.7998	18.49	0.043	**0.5**	**Below the Limits**
				5G	0.3661	19.29	0.018		
2.	Lungtenphu (BTL2) (upper part)	27°27'09.7'' N	89°39'32.0" E	LTE 700	0.7743	12.14	0.063	**0.5**	**Below the Limits**
				UMTS 850	0.7947	12.87	0.061		
				GSM 900	0.8861	13.27	0.066		
				LTE 1800	1.565	18.49	0.084		
				TDD2300	1.644	19.29	0.085		
				5G 3.5-3.6	0.5145	19.29	0.026		

				UMTS 1900	1.469	19.29	0.076		
3	Olakha (BTL1) (near Emission testing)	27°26'59.7'' N	89°39'38.0" E	LTE 1800	1.203	18.49	0.065	**0.5**	**Below the Limits**
				5G 3.5-3.6	0.2244	19.29	0.011		
				TDD 2300	0.08661	19.29	0.004		
4	Olakha (BTL2) (opposite of Asha bakery)	27°27'04.1'' N	89°39'36.2" E	LTE 1800	1.976	18.49	0.106		
				5G	0.2019	19.29	0.010	**0.5**	**Below the Limits**
5	Olakha Park (BTL3)	27°26'49.4'' N	89°39'39.1" E	LTE 700	2.42	12.14	0.199		
				TDD 2300	1.531	19.29	0.079		
				LTE 1800	0.8841	18.49	0.047		
				5G	0.7843	19.29	0.040		
				GSM 900	0.3353	13.27	0.025	**0.5**	**Below the Limits**
				UMTS 850	0.09527	12.87	0.007		
				UMTS 1900	0.05749	19.29	0.002		
6	Olakha (BTL4) (above Aariya Hotel)	27°26'41.8'' N	89°39'40.9" E	LTE 1800	1.775	18.49	0.095		
				5G	0.1886	19.29	0.009		
				TDD 2300	0.1564	19.29	0.008		
				LTE 700	0.1228	12.14	0.010	**0.5**	**Below the Limits**

7	Babesa (BTL1) (zero point junction)	27°25'36.0'' N	89°38'32.0" E	UMTS 850	0.9159	12.87	0.071	**0.5**	**Below the Limits**
				TDD 2300	0.869	19.29	0.045		
				LTE 700	0.7835	12.14	0.064		
				LTE 1800	0.4875	18.49	0.026		
				GSM 900	0.4677	13.27	0.035		
				5G	0.2943	19.29	0.015		
8	Babesa (BTL2) (opposite of Royal Enfield shoe room)	27°25'49.7'' N	89°38'45.5" E	TDD 2300	0.1469	19.29	0.007	**0.5**	**Below the Limits**
				LTE 700	1.714	12.14	0.141		
				LTE 1800	5.31	18.49	0.287		
				5G	0.193	19.29	0.010		
				UMTS 850	0.09283	12.87	0.007		
9	Babesa (BTL3) (near Garab Nyed Yon Limiyed dratshang Lhentshog)	27°26'28.2'' N	89°39'39.7" E	TDD 2300	1.545	19.29	0.080	**0.5**	**Below the Limits**
				UMTS 1900	1.259	19.29	0.065		
				GSM 900	0.6615	13.27	0.049		
				5G	0.5766	19.29	0.029		
				UMTS 850	0.561	12.87	0.043		
				LTE 1800	0.4873	18.48	0.026		
				LTE 700	0.3374	12.14	0.027		

10	Babesa (BTL4) (Opposite of NGN)	27°26'21.0'' N	89°39'33.3" E	LTE 1800	2.908	18.49	0.157	**0.5**	**Below the Limits**
				5G	0.2839	19.29	0.014		
11	Babesa (BTL5) (Opposite of Sangay Enterprise)	27°26'05.5'' N	89°39'12.9" E	LTE 700	0.1097	12.14	0.009	**0.5**	**Below the Limits**
				UMTS 850	1.058	12.87	0.082		
				GSM 900	0.07942	13.27	0.005		
				LTE 1800	0.6527	18.48	0.035		
				UMTS 1900	0.7468	19.29	0.038		
				TDD 2300	2.848	19.29	0.147		
				5G	0.6961	19.29	0.036		
12	Babesa (BTL6) (above Tobgyel School)	27°25'50.6'' N	89°38'53.4" E	LTE 1800	1.629	18.48	0.088	**0.5**	**Below the Limits**
13	Babesa (BTL7)(on the way to serbithang)	27°25'45.1'' N	89°38'53.5" E	LTE 700	0.6919	12.14	0.056	**0.5**	**Below the Limits**
				UMTS 850	0.4818	12.87	0.037		
				GSM 900	0.4607	13.27	0.034		
				LTE 1800	0.5586	18.48	0.030		
				UMTS 1900	0.2549	19.29	0.013		
				TDD 2300	0.9914	19.29	0.051		

				5G	0.362	19.29	0.018		

2. Thimphu Thromde (Tashi InfoCom Private Limited)

Sl. No	Site Name	Latitude	Longitude	Frequency Band	Field Strength Measurement Value (V/m)	BICMA Limits V/m ($1.375f^{0.5}$(MHz))/$10^{0.5}$	Exposure Ratio SQRT (Measured V/Limit Value)^2	Exposure Ratio Limits	Remark
1	Olakha (TIPL1) (Park area)	27°26'59.7" N	89°39'38.0" E	LTE 1800	0.7455	18.64	0.039	**0.5**	**Below the Limits**
				5G 3.4-3.5	2.419	19.29	0.125		
2	Babesa (TIPL1) (Zero Area)	27°25'37.0" N	89°38'30.8" E	LTE 700	0.1154	11.95	0.009	**0.5**	**Below the Limits**
				LTE 1800	1.434	18.64	0.076		
				5G	2.009	19.29	0.104		
3	Babesa (TIPL2) (Opposite of Gyelwong Fabrication)	27°25'57.9" N	89°38'54.5" E	LTE 700	0.229	11.95	0.019	**0.5**	**Below the Limits**
				GSM 900	0.1604	13.34	0.012		
				LTE 1800	1.301	18.64	0.069		
				5G	1.417	19.29	0.073		

4	Babesa (TIPL3) (Opposite of Town cafe)	27°26'18.1" N	89°39'21.6" E	LTE 700	0.1532	11.95	0.012	**0.5**	**Below the Limits**
				UMTS 850	0.2049	12.79	0.016		
				LTE 1800	1.994	18.64	0.106		
				5G	5.217	19.29	0.270		
5	Babesa (TIPL4) (on the way to serbithang)	27°25'45.1" N	89°38'53.5" E	LTE 700	0.1211	12.14	0.009	**0.5**	**Below the Limits**
				UMTS 850	0.356	12.87	0.027		
				GSM 900	0.5474	13.27	0.041		
				LTE 1800	0.9415	18.48	0.050		
				TDD 2300	0.1657	19.29	0.008		
				5G	2.319	19.29	0.120		

Annexure 2 (Screenshot of the result)

The following are the screenshot images of measurement result;

Lungtenphu, Thimphu BTL 1

Battery:		GPS:	27°27'01.8" N	Ant:	3AX 0.4-6G
28.01.25	14:39:42		89°39'23.9" E	Cable:	SRM 5 m

SrvTbl:	BTL		
Stnd:	U_BICMA		

Table View: Detailed

Index	Service	Fmin	Fmax	Max
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	799.8 mV/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	366.1 mV/m
	Total			801.1 mV/m

Isotropic

Safety Evaluation

MR:	5 V/m	RBW:	200 kHz	Sweep Time:	383 ms	Progress:	
				Noise Suppr.:	Off	No. of Runs:	HOLD
						AVG:	6 min

Lungtenphu, Thimphu BTL 2

Battery:		GPS:	27°27'09.7" N	Ant:	3AX 0.4-6G
28.01.25	15:02:22		89°39'32.0" E	Cable:	SRM 5 m

SrvTbl:	BTL		
Stnd:	U_BICMA		

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	1.644 V/m
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	1.565 V/m
5	UMTS 1900	2 110.000 000 MHz	2 120.000 000 MHz	1.469 V/m
3	GSM 900	935.000 000 MHz	945.000 000 MHz	886.1 mV/m
2	UMTS 850	879.000 000 MHz	889.000 000 MHz	794.7 mV/m
1	LTE 700	783.000 000 MHz	803.000 000 MHz	774.3 mV/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	514.5 mV/m
	Total			2.399 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.034 s	Progress:	
				Noise Suppr.:	Off	No. of Runs:	HOLD
						AVG:	6 min

Olakha, Thimphu BTL 1

Battery:		GPS:	27°26'59.7" N	Ant:	3AX 0.4-6G
24.02.25	10:13:38		89°39'38.0" E	Cable:	SRM 5 m

SrvTbl:	BTL
Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	1.203 V/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	224.4 mV/m
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	86.61 mV/m
	Others			1.458 V/m
	Total			1.689 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.312 s	Progress:	
				Noise Suppr.:	Off	No. of Runs:	HOLD
						AVG:	6 min

Olakha, Thimphu BTL 2

Battery:		GPS:	27°27'04.1" N	Ant:	3AX 0.4-6G
28.01.25	15:20:07		89°39'36.2" E	Cable:	SRM 5 m

SrvTbl:	BTL
Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	1.976 V/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	201.9 mV/m
	Total			1.984 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	384 ms	Progress:	
				Noise Suppr.:	Off	No. of Runs:	HOLD
						AVG:	6 min

Olakha Park, Thimphu BTL 3

Battery:		GPS:	27°26'49.4" N	Ant:	3AX 0.4-6G
24.02.25	10:41:15		89°39'39.1" E	Cable:	SRM 5 m

SrvTbl:	BTL		
Stnd:	U_BICMA		

Table View: Detailed

Index	Service	Fmin	Fmax	Max
1	LTE 700	783.000 000 MHz	803.000 000 MHz	2.420 V/m
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	1.531 V/m
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	884.1 mV/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	784.3 mV/m
3	GSM 900	935.000 000 MHz	945.000 000 MHz	335.3 mV/m
2	UMTS 850	879.000 000 MHz	889.000 000 MHz	95.27 mV/m
5	UMTS 1900	2 110.000 000 MHz	2 120.000 000 MHz	57.49 mV/m
	Others			788.0 mV/m
	Total			2.759 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.978 s
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Olakha, Thimphu BTL 4

Battery:		GPS:	27°26'41.8" N	Ant:	3AX 0.4-6G
26.03.25	10:34:40		89°39'40.9" E	Cable:	SRM 5 m

SrvTbl:	BTL		
Stnd:	U_BICMA		

Table View: Detailed

Index	Service	Fmin	Fmax	Max
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	1.775 V/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	188.6 mV/m
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	156.4 mV/m
1	LTE 700	783.000 000 MHz	803.000 000 MHz	122.8 mV/m
	Others			766.9 mV/m
	Total			1.936 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.965 s
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Babesa, Thimphu BTL 1

Battery:		GPS:	27°25'36.0" N	Ant:	3AX 0.4-6G
26.03.25	11:13:38		89°38'32.0" E	Cable:	SRM 5 m

SrvTbl:	BTL	
Stnd:	U_BICMA	

Table View: Detailed

Index	Service	Fmin	Fmax	Max
2	UMTS 850	879.000 000 MHz	889.000 000 MHz	915.9 mV/m
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	869.0 mV/m
1	LTE 700	783.000 000 MHz	803.000 000 MHz	783.5 mV/m
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	487.5 mV/m
3	GSM 900	935.000 000 MHz	945.000 000 MHz	467.7 mV/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	294.3 mV/m
	Others			1.729 V/m
	Total			1.929 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.973 s
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Babesa, Thimphu BTL 2

Battery:		GPS:	27°25'49.7" N	Ant:	3AX 0.4-6G
26.03.25	11:33:51		89°38'45.5" E	Cable:	SRM 5 m

SrvTbl:	BTL
Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	5.310 V/m
1	LTE 700	783.000 000 MHz	803.000 000 MHz	1.714 V/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	193.0 mV/m
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	146.9 mV/m
2	UMTS 850	879.000 000 MHz	889.000 000 MHz	92.83 mV/m
	Others			1.223 V/m
	Total			5.489 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.969 s
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Babesa, Thimphu BTL 3

Battery:		GPS:	27°26'28.2" N	Ant:	3AX 0.4-6G	SrvTbl:	BTL
27.03.25	11:22:21		89°39'39.7" E	Cable:	SRM 5 m	Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	1.545 V/m
5	UMTS 1900	2 110.000 000 MHz	2 120.000 000 MHz	1.259 V/m
3	GSM 900	935.000 000 MHz	945.000 000 MHz	661.5 mV/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	576.6 mV/m
2	UMTS 850	879.000 000 MHz	889.000 000 MHz	561.0 mV/m
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	487.3 mV/m
1	LTE 700	783.000 000 MHz	803.000 000 MHz	337.4 mV/m
	Total			1.810 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.031 s	Progress:	
				Noise Suppr.:	Off	No. of Runs:	HOLD
						AVG:	6 min

Babesa, Thimphu BTL 4

Battery:		GPS:	27°26'21.0" N	Ant:	3AX 0.4-6G	SrvTbl:	BTL
27.03.25	11:38:37		89°39'33.3" E	Cable:	SRM 5 m	Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	2.908 V/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	283.9 mV/m
	Total			2.914 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	380 ms	Progress:	
				Noise Suppr.:	Off	No. of Runs:	HOLD
						AVG:	6 min

Babesa, Thimphu BTL 5

Battery:		GPS:	27°26'05.5" N	Ant:	3AX 0.4-6G
27.03.25	11:55:08		89°39'12.9" E	Cable:	SRM 5 m

SrvTbl:	BTL
Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	2.848 V/m
2	UMTS 850	879.000 000 MHz	889.000 000 MHz	1.058 V/m
5	UMTS 1900	2 110.000 000 MHz	2 120.000 000 MHz	746.8 mV/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	696.1 mV/m
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	652.7 mV/m
1	LTE 700	783.000 000 MHz	803.000 000 MHz	109.7 mV/m
3	GSM 900	935.000 000 MHz	945.000 000 MHz	79.42 mV/m
	Total			2.948 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.035 s	Progress:	
				Noise Suppr.:	Off	No. of Runs:	HOLD
						AVG:	6 min

Babesa, Thimphu BTL 6

Battery:		GPS:	27°25'50.6" N	Ant:	3AX 0.4-6G
27.03.25	12:11:08		89°38'53.4" E	Cable:	SRM 5 m

SrvTbl:	BTL
Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	1.629 V/m
	Total			1.629 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	185 ms	Progress:	
				Noise Suppr.:	Off	No. of Runs:	HOLD
						AVG:	6 min

Babesa, Thimphu BTL 7

Battery:		GPS:	27°25'45.1" N	Ant:	3AX 0.4-6G
27.03.25	12:25:16		89°38'53.5" E	Cable:	SRM 5 m

SrvTbl:	BTL
Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	TDD 2300	2 310.000 000 MHz	2 350.000 000 MHz	991.4 mV/m
1	LTE 700	783.000 000 MHz	803.000 000 MHz	691.9 mV/m
4	LTE 1800	1 815.000 000 MHz	1 845.000 000 MHz	558.6 mV/m
2	UMTS 850	879.000 000 MHz	889.000 000 MHz	481.8 mV/m
3	GSM 900	935.000 000 MHz	945.000 000 MHz	460.7 mV/m
7	5G	3 500.000 000 MHz	3 600.000 000 MHz	362.0 mV/m
5	UMTS 1900	2 110.000 000 MHz	2 120.000 000 MHz	254.9 mV/m
	Total			1.313 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.031 s
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Olakha, Thimphu TIPL 1

Battery:		GPS:	27°26'59.7" N	Ant:	3AX 0.4-6G
24.02.25	10:23:50		89°39'38.0" E	Cable:	SRM 5 m

SrvTbl:	TICPL
Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	5G	3 400.000 000 MHz	3 500.000 000 MHz	2.419 V/m
4	LTE 1800	1 845.000 000 MHz	1 880.000 000 MHz	745.5 mV/m
	Others			558.8 mV/m
	Total			2.493 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.228 s
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Babesa, Thimphu TIPL 1

Battery:		GPS:	27°25'37.0" N	Ant:	3AX 0.4-6G
26.03.25	10:57:38		89°38'30.8" E	Cable:	SRM 5 m

SrvTbl:	TICPL		
Stnd:	U_BICMA		

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	5G	3 400.000 000 MHz	3 500.000 000 MHz	2.009 V/m
4	LTE 1800	1 845.000 000 MHz	1 880.000 000 MHz	1.434 V/m
1	LTE 700	758.000 000 MHz	778.000 000 MHz	115.4 mV/m
	Others			2.417 V/m
	Total			2.888 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.922 s
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Babesa, Thimphu TIPL 2

Battery:		GPS:	27°25'57.9" N	Ant:	3AX 0.4-6G
26.03.25	11:49:25		89°38'54.5" E	Cable:	SRM 5 m

SrvTbl:	TICPL		
Stnd:	U_BICMA		

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	5G	3 400.000 000 MHz	3 500.000 000 MHz	1.417 V/m
4	LTE 1800	1 845.000 000 MHz	1 880.000 000 MHz	1.301 V/m
3	GSM 900	945.000 000 MHz	955.000 000 MHz	160.4 mV/m
1	LTE 700	758.000 000 MHz	778.000 000 MHz	122.9 mV/m
	Others			1.353 V/m
	Total			1.887 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	1.925 s
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Babesa, Thimphu TIPL 3

Battery:		GPS:	27°26'18.1" N	Ant:	3AX 0.4-6G
26.03.25	12:11:58		89°39'21.6" E	Cable:	SRM 5 m

SrvTbl:	TICPL		
Stnd:	U_BICMA		

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	5G	3 400.000 000 MHz	3 500.000 000 MHz	5.217 V/m
4	LTE 1800	1 845.000 000 MHz	1 880.000 000 MHz	1.994 V/m
2	UMTS 850	869.000 000 MHz	879.000 000 MHz	204.9 mV/m
1	LTE 700	758.000 000 MHz	778.000 000 MHz	153.2 mV/m
	Total			5.259 V/m

Isotropic

Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	634 ms
				Noise Suppr.:	Off

Progress:	
No. of Runs:	HOLD
AVG:	6 min

Babesa, Thimphu TIPL 4

Battery:		GPS:	27°25'45.1" N	Ant:	3AX 0.4-6G
27.03.25	12:33:26		89°38'53.5" E	Cable:	SRM 5 m

SrvTbl:	TICPL
Stnd:	U_BICMA

Table View: Detailed

Index	Service	Fmin	Fmax	Max
6	5G	3 400.000 000 MHz	3 500.000 000 MHz	2.319 V/m
4	LTE 1800	1 845.000 000 MHz	1 880.000 000 MHz	941.5 mV/m
3	GSM 900	945.000 000 MHz	955.000 000 MHz	547.4 mV/m
2	UMTS 850	869.000 000 MHz	879.000 000 MHz	356.0 mV/m
5	TDD 2300	2 350.000 000 MHz	2 390.000 000 MHz	165.7 mV/m
1	LTE 700	758.000 000 MHz	778.000 000 MHz	121.1 mV/m
	Total			2.376 V/m

Isotropic

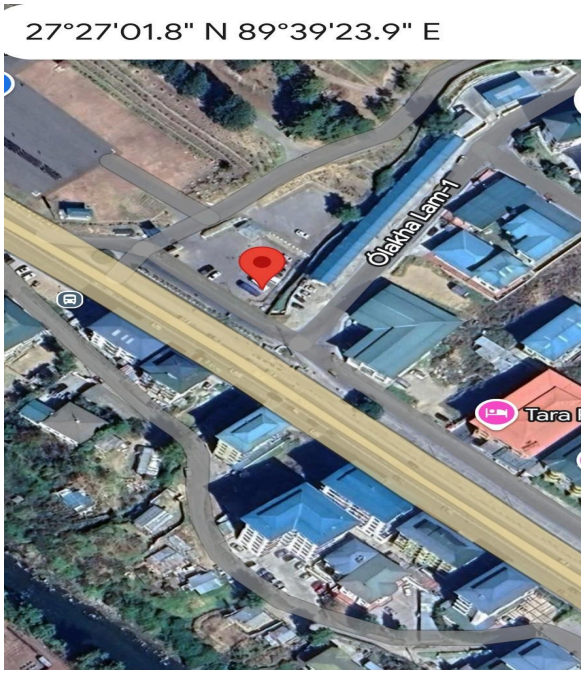
Safety Evaluation

MR:	20 V/m	RBW:	200 kHz	Sweep Time:	908 ms
				Noise Suppr.:	Off

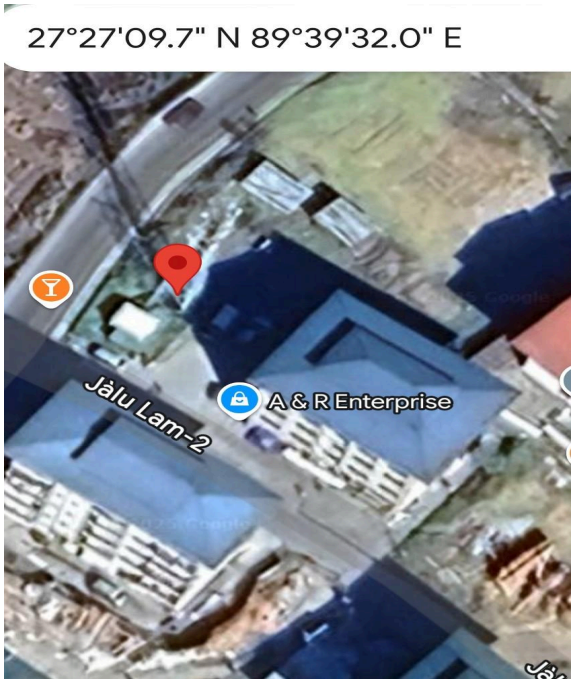
Progress:	
No. of Runs:	HOLD
AVG:	6 min

Annexure 3 (Satellite View of Location of Monitored Sites)

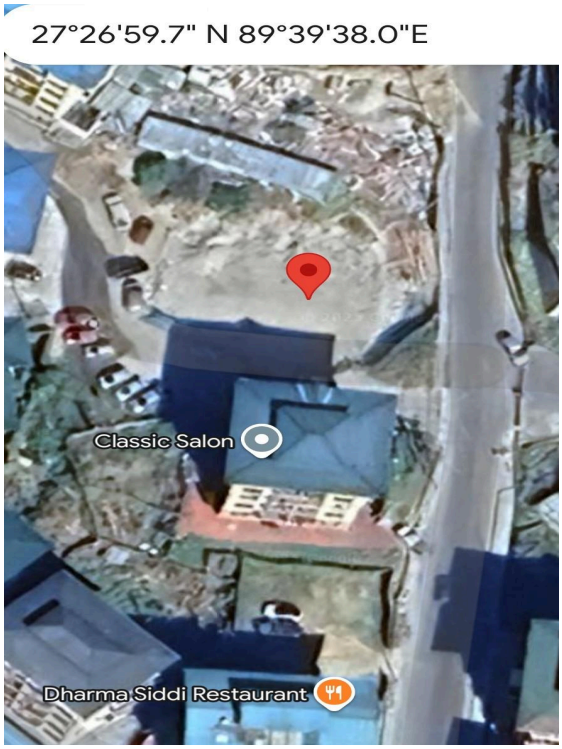
The following are the satellite view of the measurement location of the each Telecom site transmitter;



Lungtenphu (BTL1), Near Helipad

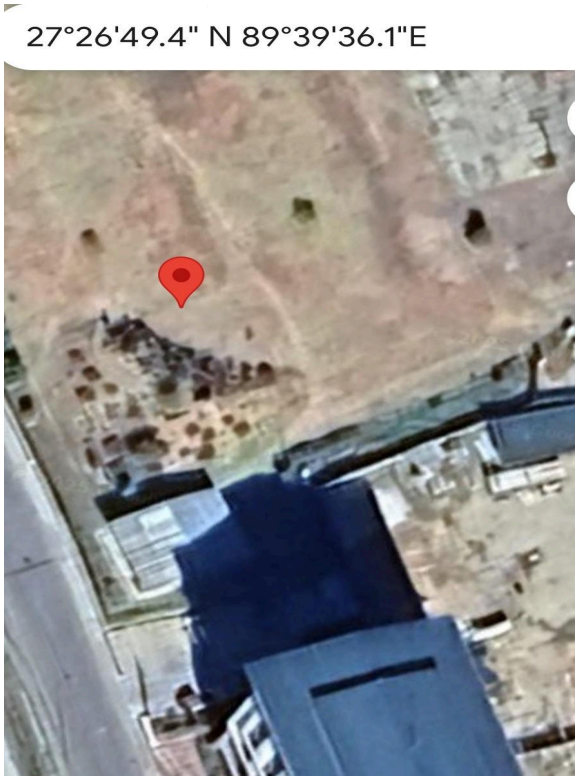


Lungtenphu(BTL2), Upper part

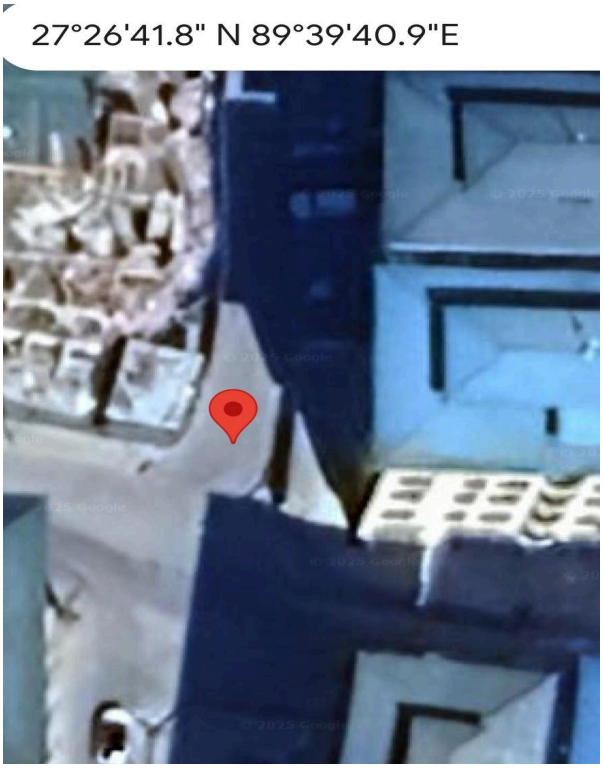


Olakha (BTL1), Near Emission Testing

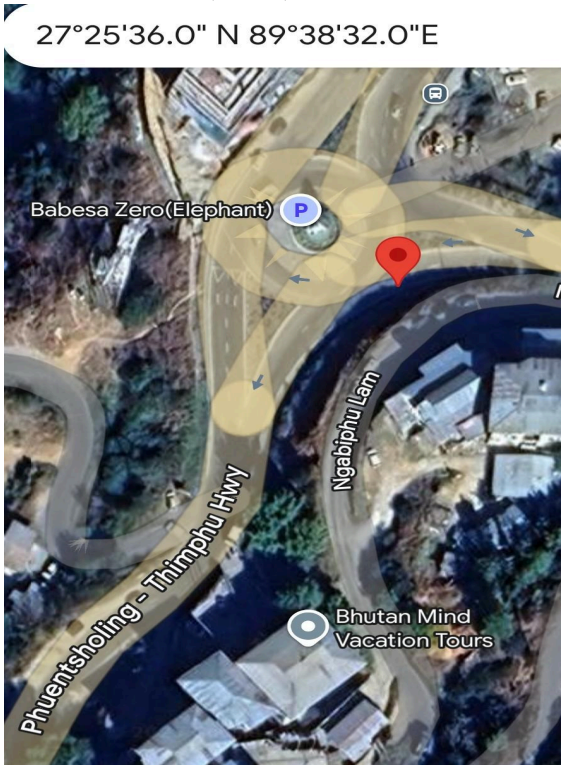
Olakha(BTL2), Opposite of Asha Bakery



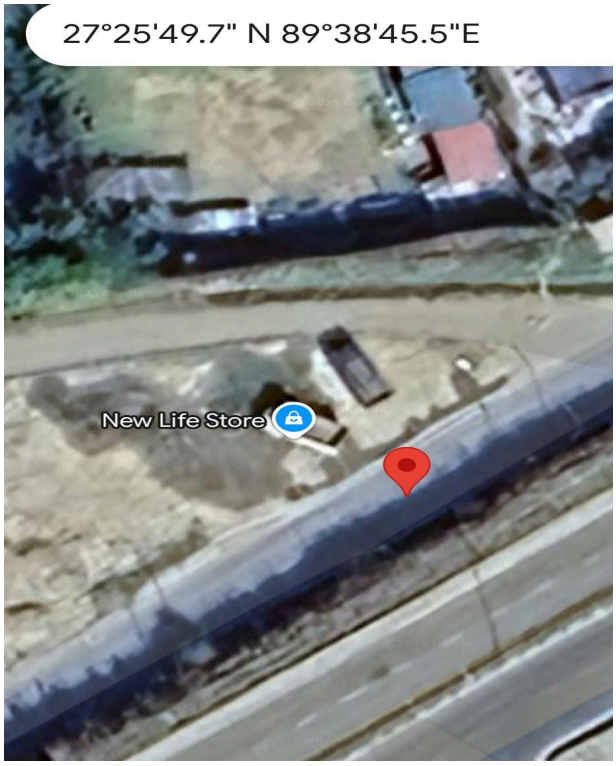
Olakha Park (BTL3)



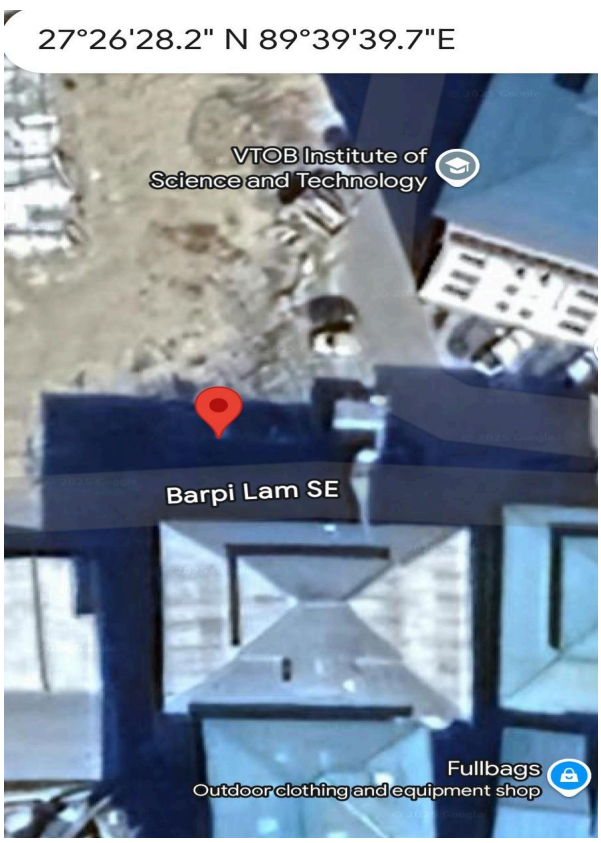
Olakha(BTL4), Above Aariya Hotel



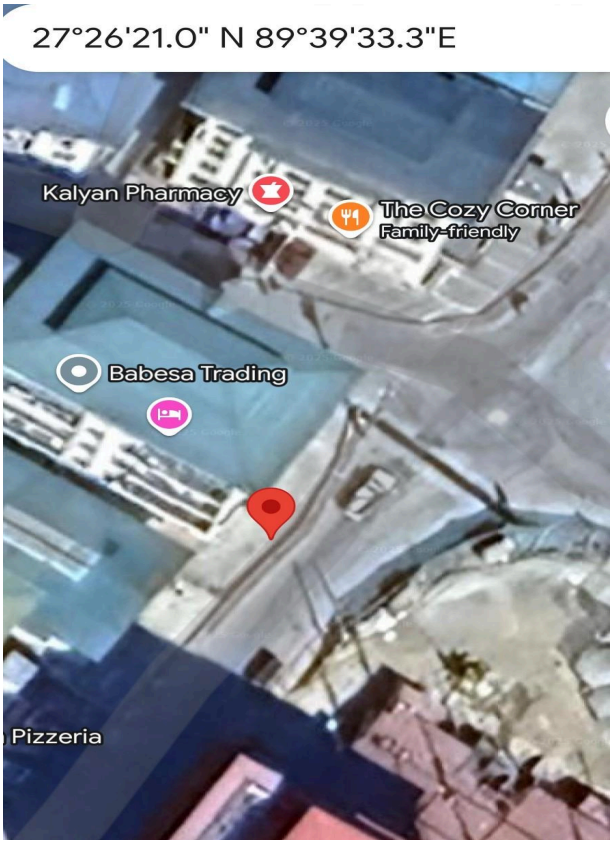
Babesa (BTL1), Zero Point Junction



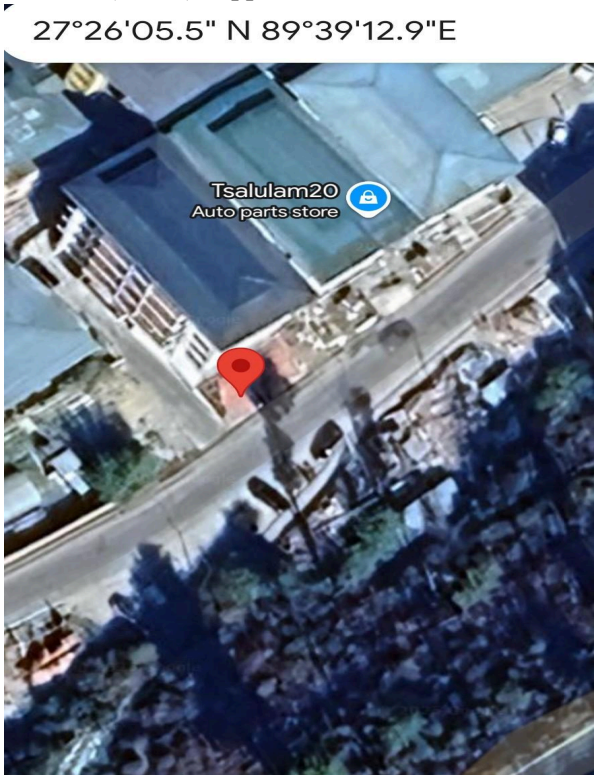
Babesa(BTL3), Near Garab Nyed Yon Limiyed dratshang



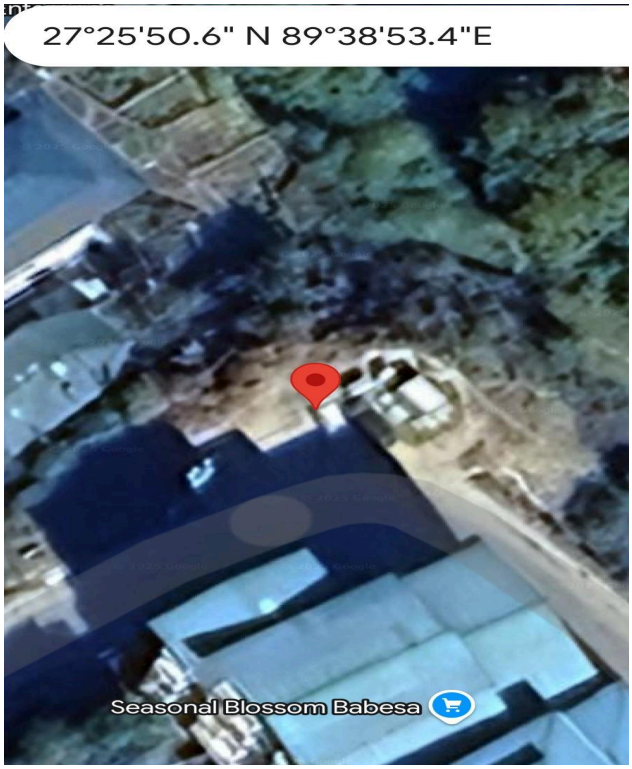
Babesa(BTL4), Opposite of NGN



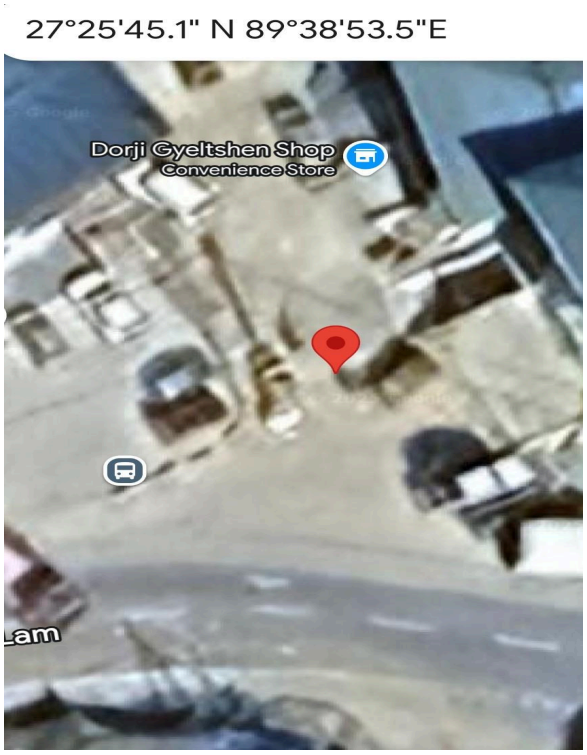
Babesa(BTL5), Opposite of Sangay Enterprise



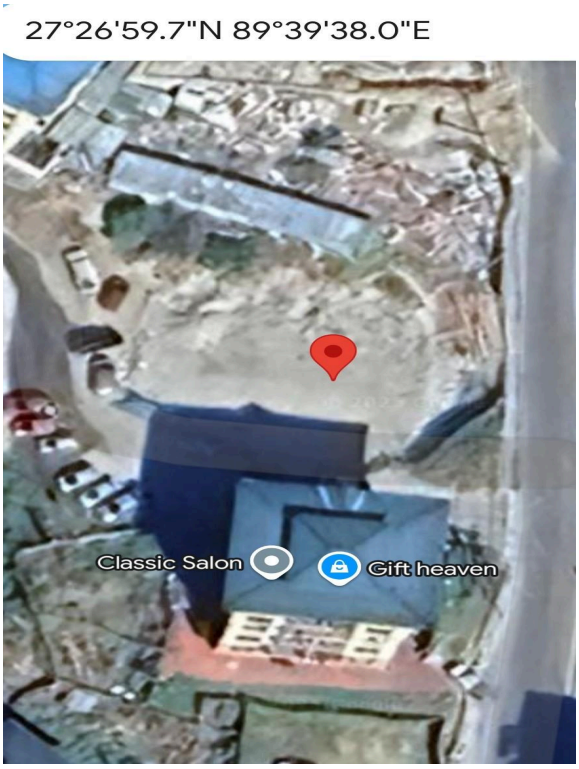
Babesa(BTL6), Above Tobgyel School



Babesa(BTL7), On the Way to Serbithang

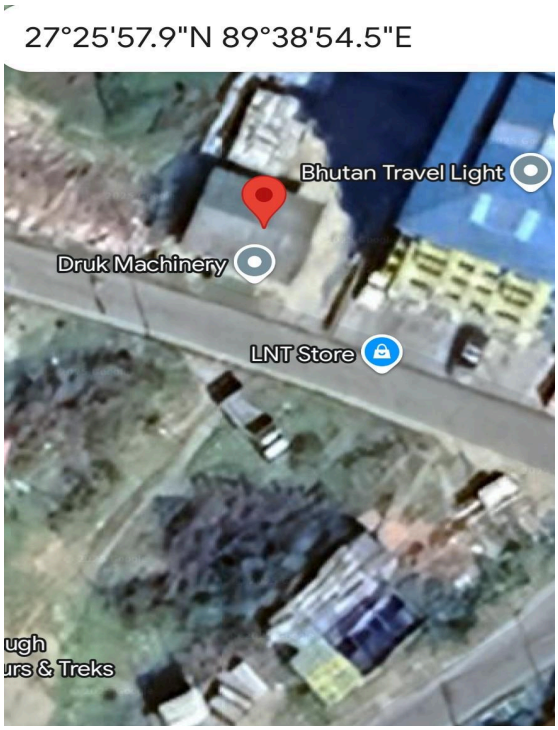


Olakha(TIPL1), Park Area



Babesa(TIPL1), Zero Area

Babesa(TIPL2), Opposite of Gyelwong Fabrication



Babesa(TIPL3), Opposite of Town cafe

Annexure 4 (Image of Monitored BTS)

The following are the images of the each Telecom BTS transmitters;

Lungtenphu BTL 1

Lungtenphu BTL 2

Olakha BTL 1

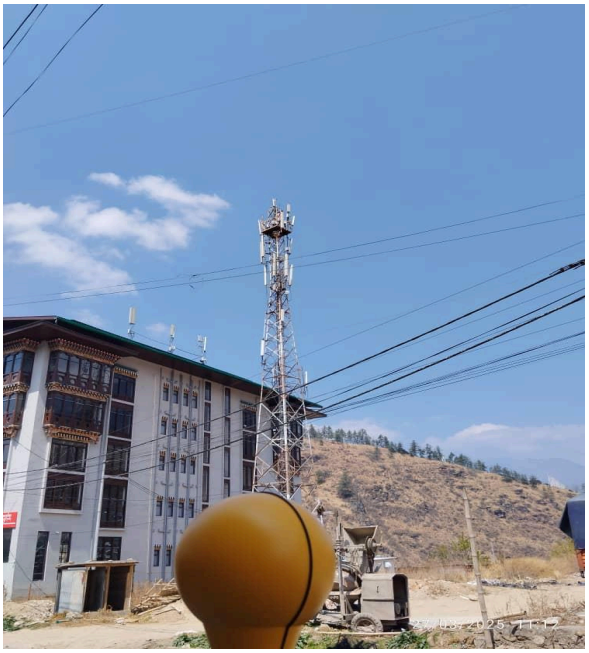
Olakha BTL 2

Olakha Park BTL 3

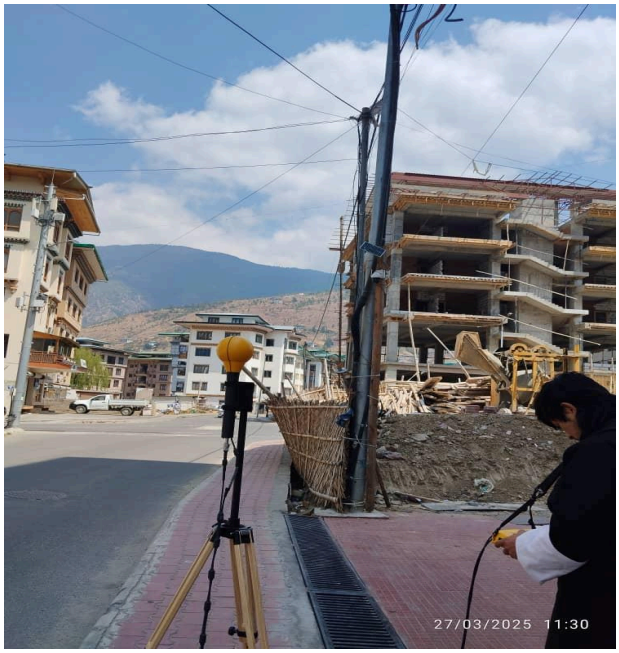
Olakha BTL 4

Babesa BTL 1

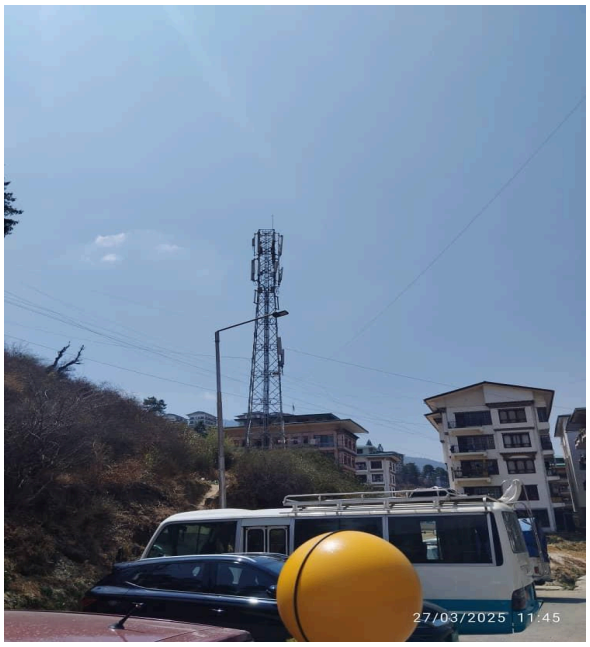
Babesa BTL 2



Babesa BTL 3

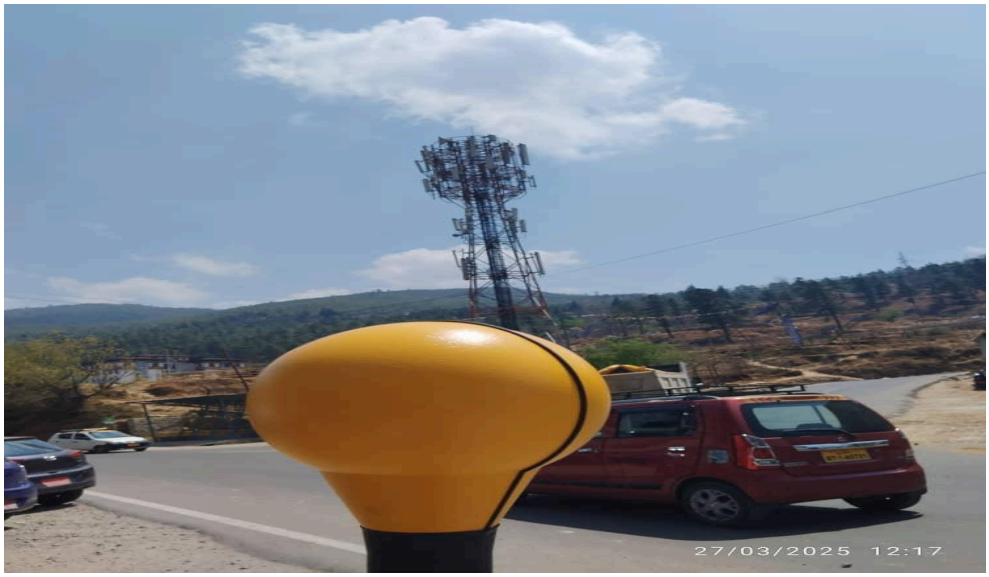


Babesa BTL 4



Babesa BTL 5

Babesa BTL 6



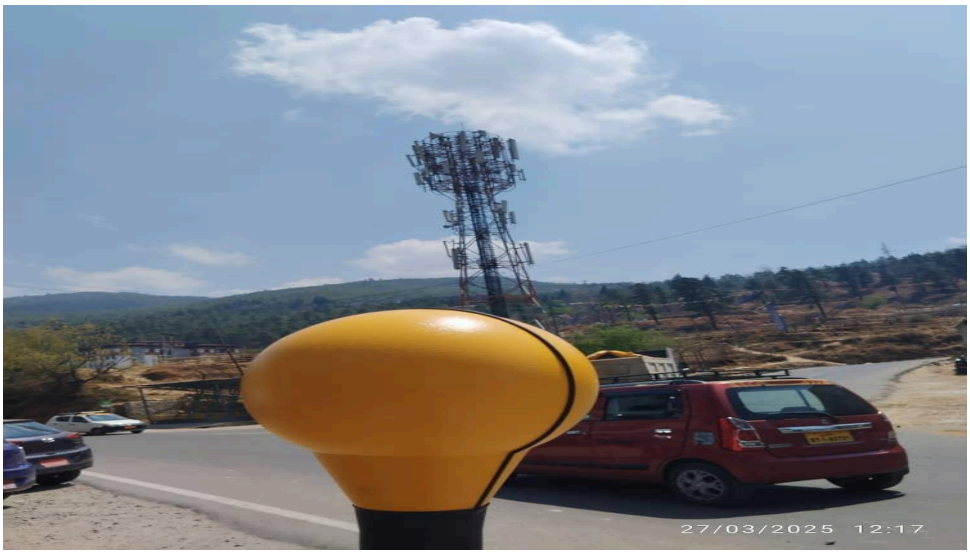
Babesa BTL 7

Olakha TIPL 1

Babesa TIPL 1

Babesa TIPL 2

Babesa TIPL 3



Babesa TIPL 4