

Quarterly Report on Frequency Spectrum Monitoring

(January - March 2024)



Bhutan InfoComm and Media Authority
Royal Government of Bhutan

March 2024

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1. Background

Spectrum monitoring is the practice of maintaining and monitoring the network or devices that use Radio Frequency (RF) signals and frequencies. Due to the growing demands on the radio frequency spectrum, it is critical that spectrum monitoring is consistently carried out and also keep track with advanced techniques in radio communication technology. Spectrum monitoring is carried out mainly to ensure that technical parameters and standards or guidelines for radiocommunication systems are adhered to by the users. In addition spectrum monitoring assists in promoting the efficient utilization of the radio frequency spectrum.

Spectrum Monitoring is closely associated with inspection and compliance that enables the identification and measurement of spectrum usage, interference sources, the verification of proper technical and operation characteristics of radiated signals, and detection and identification of illegal transmitters. The Monitoring further supports the overall spectrum management effort by providing general measurement of channel and band usage, including the channel availability and measure of spectrum occupancy.

The Bhutan InfoComm and Media Authority conducts fixed and mobile spectrum monitoring to ensure that spectrum use complies with the National Radio Rules and Regulations. The monitoring can detect, identify and resolve the unauthorized transmission or interference, verify technical and operational parameters, and to monitor occupancy and field strength.

2. Monitoring

To ensure effective and proper utilization of spectrum, to control unauthorized transmission and to ensure compliance of equipment and stations with the the National Radio Rules and Regulation, the Authority has monitored the fixed and mobile spectrum from January to March, 2024 in following places;

Sl. No	Monitored Places	Monitored Frequency
1.	Tsirang (Fixed Spectrum Monitoring for FM transmitters)	85 MHz-108 MHz
1.	Haa (Canceled RadioCommunication Apparatus License Monitoring / Spectrum Occupancy)	VHF, UHF, 2G, 3G, 4G and 5G Frequencies
2.	Paro (Canceled RadioCommunication Apparatus License Monitoring and Spectrum Occupancy)	VHF, UHF, 2G, 3G, 4G and 5G Frequencies
3.	Tsirang (Fixed Spectrum Monitoring for HF Frequencies)	HF Frequency range 4MHz- 22 MHz
4.	Thimphu (Fixed Spectrum Monitoring)	VHF (142 MHz-150 MHz) and 2G Frequencies.

3. Objective of Spectrum Monitoring

The main objective of the Spectrum measurement monitoring is:

- a. To ensure the authorized spectrum for proper application in conformity with the licensing terms and conditions.
- b. To survey and inspect radio communication systems.
- c. To ensure compliance of transmitters and stations with the National Radio Rules and Regulations.
- d. To detect and identify unauthorized transmission.
- e. To determine the spectrum occupancy, field strength and assessment of channel availability which will be useful for proper spectrum planning and management.

4. Details of the Equipment used for Fixed and Mobile Spectrum Monitoring

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

a. Fixed Spectrum Monitoring

Equipment Make/Model: LS Telecom FMU308w
Type of the Antenna: HF/VHF/UHF/SHF omni-directional antenna
Monitoring Receiver: FMU supports frequency range from 9kHz to 8GHz
Calibration details: Calibrated on 15-02-2023 and valid up to 2 to 3 years

b. Mobile Spectrum Monitoring

Equipment Make/Model: Narda SignalShark 3310
Type of the Antenna: HF/VHF/UHF/SHF directional antennas
Spectrum Analyzer/Receiver: Frequency range for the receiver is from 8KHz to 8GHz
Calibration details: Calibrated on 23-01-2023 and valid up to 2 to 3 years

5. Methodology

The Spectrum measurement monitoring was carried out as mentioned below;

a. Fixed Spectrum Monitoring

The fixed spectrum monitoring was done with the Fixed Monitoring equipment and LS Observer software for the transmission frequency signals. The Fixed Monitoring equipment is fixed to a particular location and the monitoring is usually done through the scanning of the frequency and obtaining its transmission and reception characteristics.

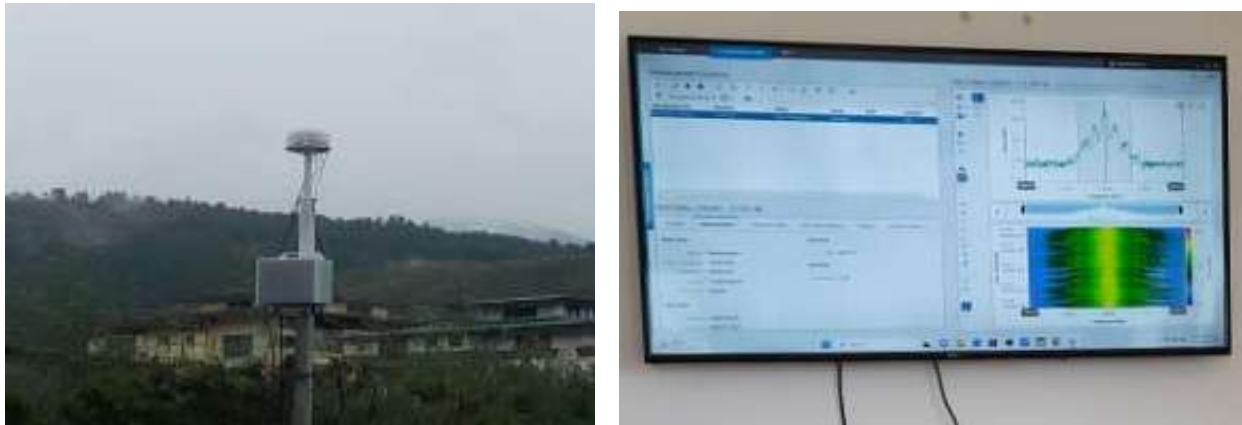


Figure 1: Fixed Spectrum Monitoring

b. Mobile Spectrum Monitoring

The Mobile Spectrum Monitoring was carried out using the DF monitoring equipment which was mounted in the roof of the car. These vehicles are passenger cars used to carry equipment and antennas. The antenna array used for DF and monitoring is mounted in an unobtrusive roof-top carrier mounted directly to the luggage rack on the roof of the car. The monitoring and DF equipment is mounted in the luggage area at the rear of the car.



Figure 2: Mobile Spectrum Monitoring

6. Findings

i. Fixed Spectrum Monitoring for FM Transmitter in Tsirang

1. The team have carried out the fixed Spectrum Monitoring for FM transmitter frequencies ranging from 86 MHz to 108 MHz in Tsirang.
2. During the monitoring, we have found out that following frequencies are actively operating and occupying the band and also done with the audio listing monitoring for each occupied band.

Sl.	Frequency Range	Spectrum Occupancy	Remark
1	88.158 MHz	Active/Occupied	Operating by BBS
2.	88.883 MHz	Active/Occupied	Operating by BBS
3.	90.0033 MHz	Active/Occupied	Operating by BBS
4.	92.058 MHz	Active/Occupied	Operating by BBS
5.	93.033 MHz	Active/Occupied	Operating by BBS
6.	94.233 MHz	Active/Occupied	Operating by Indian Broadcaster
7	96.633 MHz	Active/Occupied	Operating by BBS
9	100.483 MHz	Active/Occupied	Operating by Indian Broadcaster
10	103.295 MHz	Active/Occupied	Operating by Indian Broadcaster
11	104.070 MHz	Active/Occupied	Operating by Kuzoo FM
12	102.658 MHz	Active/Occupied	Operating by Indian Broadcaster

3. The details of the Spectrum Monitoring result is attached in **Annexure 1**
4. We have found that some frequencies **94.233 MHz, 100.483 MHz, 103.295 MHz and 103.295 MHz** were operated by Indian Broadcasters.

ii. Canceled Radio Communication Apparatus Licensed Monitoring

The Authority had monitored the canceled Radio license in Two Dzongkhag as mentioned below and detailed monitoring results are attached in **Annexure 2**.

1. Paro Dzongkhag

SL	License Name	Licensee No	Area of operation	Expiry date	Frequency	Remarks
1.	Druk Air Corporation	502000018	Paro	17.8.19	8921, 13342, 118.2 MHz	Not in use
2	Xplore Bhuyan	502000027	Paro	29.6.23	138.8 MHz	Not in use
3.	Como Uma Bhutan Eco Ventures	502000310	Paro	7.8.21	161.525,1 68.025,17 0.75 MHz	Not in use
4	ST Trading Import & Export		Paro	27.7.20	407.950 MHz	Not in use
5	Druk Lhayul Construction	502000246	Paro	4.8.20	407.850 MHz	Not in use
6	Happiness Kingdom Travel	502000305	Paro	16.2.20	162.875 MHz	Not in use
7	Tashi Air Private Limited	502000347	Paro	8.6.21	162.025, 162.250, 162.350 MHz	Not in use
8	Indo General Stores	502000365	Paro	10.5.20	139.275 MHz	Not in use

9	Dekiling Enterprise	502000373	Paro	5.7.22	407.000 MHz	Not in use
10	Bhutan Venture Hospitality	502000399	Paro	14.5.21	139.2 MHz	Not in use
11	Cee Dee Organic Mushroom Farm		Paro	13.10.23	141 MHz	Not in use

2. Haa Dzongkhag

SL	Name of Licence	Licensee No	Area of operation	Expiry date	Frequency	Remarks
1	Lhayul Construction	502000033	Haa	5.7.23	140.375 MHz	Not in use
2	Haa Dzongkhag	502000036	Haa	7.7.20	162.75 MHz	Not in use
3	Jigme Khaser Strict Nature Reserve	502000109	Haa	28.4.22	165.4 MHz	Not in Use
4.	National Centre for Riverine and Fisheries	502000252	Haa	2.10.21	457.500 MHz	Not in use
5	Jigme Khaser Strict Nature Reserve	502000280	Haa	17.10.22	170..900, 170.95 MHz	Not in use
6	Chundu Namgay	502000325	Haa	26.6.19	164.95 MHz	Not in use

iii. Spectrum Occupancy Monitoring in Haa and Paro

The power emission and frequency used of the 2G, 3G, 4G and 5G transmitter monitored in Haa and Paro are as mentioned below and are all within the permissible limits.

a. Paro

SL	Name of Operator	Frequency Band	Signal Strength dBm	Location
1	Bhutan Telecom	900 MHz	-52.68	Paro
2	Tashicell	900 MHz	-63.38	Paro
3	Tashicell	850 MHz	-67.42	Paro
4	Bhutan Telecom	850 MHz	-38.28	Paro
5	Bhutan Telecom	700 MHz	-50.39	Paro
6	Tashicell	700 MHz	-53.41	Paro
7	Bhutan Telecom	1800 MHz	-52.40	Paro
8	Tashicell	1800 MHz	-44.41	Paro

b. Haa

SL	Name of Operator	Frequency Band	Signal Strength dBm	Location
1	Tashicell	900 MHz	-67.38	Haa
2	Bhutan Telecom	900 MHz	-54.68	Haa
3	Bhutan Telecom	850 MHz	-40.28	Haa
4	Tashicell	850 MHz	-65.42	Haa
5	Bhutan Telecom	700 MHz	-54.39	Haa
6	Tashicell	700 MHz	-51.41	Haa

7	Bhutan Telecom	1800 MHz	-57.40	Haa
8	Tashicell	1800 MHz	-49.41	Haa

There is no out of band transmission from the 2G, 3G, 4G and 5G transmitters of both the operators. The detailed findings record are attached in **annexure 3**.

iv. Fixed Spectrum Monitoring for HF frequencies in Tsirang

1. The team have carried out the fixed Spectrum Monitoring for HF frequencies ranging from 4 MHz to 22 MHz in Tsirang.
2. During the monitoring, we have found out that following frequencies are actively operating and occupying the band and also done with the audio listing monitoring for each occupied band.

SL	Frequency Range	Occupancy	Type of Signal	Remark
1.	4.819 MHz	Active	Broadcasting	Chinese
2.	4.907 MHz	Active	Broadcasting	Tibetan
3.	5.937 MHz	Active	Broadcasting	Chinese
4.	6.024 MHz	Active	Broadcasting	Tibetan
5	6.049 MHz	Active	Broadcasting	Tibetan
6	6.13 MHz	Active	Broadcasting	Chinese
7	6.203 MHz	Active	Broadcasting	Chinese
8	7.221 MHz	Active	Broadcasting	Chinese
9	9.485 MHz	Active	Broadcasting	Chinese
10	9.582 MHz	Active	Broadcasting	Chinese
11	9.630 MHz	Active	Broadcasting	Chinese
12	9.733 MHz	Active	Broadcasting	Chinese

13	11.6 MHz	Active	Broadcasting	Chinese
14	11.684 MHz	Active	Broadcasting	Tibetan
12	11.890 MHz	Active	Broadcasting	Chinese
13	11.915 MHz	Active	Broadcasting	Chinese
14	11.950 MHz	Active	Broadcasting	Chinese
15	12.081 MHz	Active	Broadcasting	Chinese
16	13.644 MHz	Active	Broadcasting	English BBC
17	13.669 MHz	Active	Broadcasting	English BBC
18	13.75 MHz	Active	Broadcasting	Chinese
19	13.769 MHz	Active	Broadcasting	Chinese
20	14.981 MHz	Active	Broadcasting	Chinese
21	15 MHz	Active	Broadcasting	Chinese
22	15.133 MHz	Active	Broadcasting	Chinese
23	15.144 MHz	Active	Broadcasting	Chinese
24	15.219 MHz	Active	Broadcasting	Chinese
25	15.219 MHz	Active	Broadcasting	Chinese
26	15.267 MHz	Active	Broadcasting	Chinese
27	15.282 MHz	Active	Broadcasting	Chinese
28	15.311 MHz	Active	Broadcasting	Chinese
30	15.339 MHz	Active	Broadcasting	ANN, American Broadcaster
31	15.349 MHz	Active	Broadcasting	Chinese
32	15.364 MHz	Active	Broadcasting	Chinese

33	15.379 MHz	Active	Broadcasting	Chinese
34	15.412 MHz	Active	Broadcasting	Chinese
35	15.484 MHz	Active	Broadcasting	Chinese
36	15.539 MHz	Active	Broadcasting	Chinese
37	15.551 MHz	Active	Broadcasting	Chinese
38	15.570 MHz	Active	Broadcasting	Chinese
39	15.763 MHz	Active	Broadcasting	Unknown Language
40	15.8 MHz	Active	Broadcasting	Chinese
41	16.1MHz	Active	Broadcasting	Chinese
42	16.16 MHz	Active	Broadcasting	Chinese
43	17.484 MHz	Active	Broadcasting	American
44	17.512 MHz	Active	Broadcasting	Chinese
45	17.55 MHz	Active	Broadcasting	Chinese
46	17.565 MHz	Active	Broadcasting	Chinese
47	17.579 MHz	Active	Broadcasting	Chinese
48	17.597 MHz	Active	Broadcasting	Chinese
49	17.616 MHz	Active	Broadcasting	Chinese
50	17.650 MHz	Active	Broadcasting	Chinese
51	17.660 MHz	Active	Broadcasting	Chinese
52	17.675 MHz	Active	Broadcasting	English
53	17.715 MHz	Active	Broadcasting	Chinese
54	17.741 Mhz	Active	Broadcasting	Chinese

55	17.889 MHz	Active	Broadcasting	Chinese
56	21.48 MHz	Active	Broadcasting	Chinese
57	21.529 MHz	Active	Broadcasting	Chinese

3. The details of the Spectrum Monitoring result is attached in **Annexure 4**.

v. Fixed Spectrum Monitoring for VHF frequencies in Thimphu

a. Re-Monitoring for VHF frequency (136-142 MHz)

1. The team have carried out the fixed Spectrum Monitoring and audio listening whether it is occupied or noise generated from the receiver for VHF transmitter frequencies ranging from 136 MHz to 142MHz, based on the Quarterly report of October-December 2023.
2. The details of the spectrum occupancy result are attached in **annexure 5**.
3. During the Audio and spectrum occupancy monitoring, we have found out that following frequency are not operating (Could not detect the signal and audio for listening);

Sl.	Frequency Range	Spectrum Occupancy	Remark
1	136 MHz-142 MHz	No signal detected	No Audio since the frequency is not used while doing the monitoring
5 MHz band measurement completed			

4. No illegal operations were detected so far in VHF range.

b. Monitoring for VHF frequency (142-150 MHz)

1. The team have carried out the fixed Spectrum Monitoring for VHF transmitter frequencies ranging from 142 MHz to 150 MHz.
2. During the monitoring in Thimphu, we have found out that following frequency are NOT actively operating;

Sl.	Frequency Range	Spectrum Occupancy	Remark
1	142 MHz-150 MHz	No Signal detected	No Audio since the frequency is not used while doing the monitoring
8 MHz band measurement completed			

3. The details of the spectrum occupancy result are attached in **annexure 6**.
4. No illegal operations were detected so far in VHF range.

vi. Fixed Spectrum Monitoring for 2G Transmitter in Thimphu

a. Spectrum Occupancy Monitoring for GSM 900

1. The team have carried out the fixed Spectrum Monitoring for VHF transmitter frequencies ranging from 136 MHz to 140 MHz.
2. During the monitoring in Thimphu, we have found out that following frequency are actively operating and occupied the band;

Sl.	Frequency Range	Spectrum Occupancy	Remark
1	900 - 934.50 MHz	Not occupied	It may be uplink frequencies
2.	935.50-937 MHz	Occupied band is 95%	It is a down link Frequencies and actively operated by Bhutan Telecom Limited.
3.	938.50-944.50 MHz	Not Occupied	Channel is free
4.	945.50-949.50 MHz	Occupied 32.25%	It is a down link Frequencies and actively operated by Tashi Private Limited.
5.	950.50-955.50 MHz	Not Occupied	Channel is free

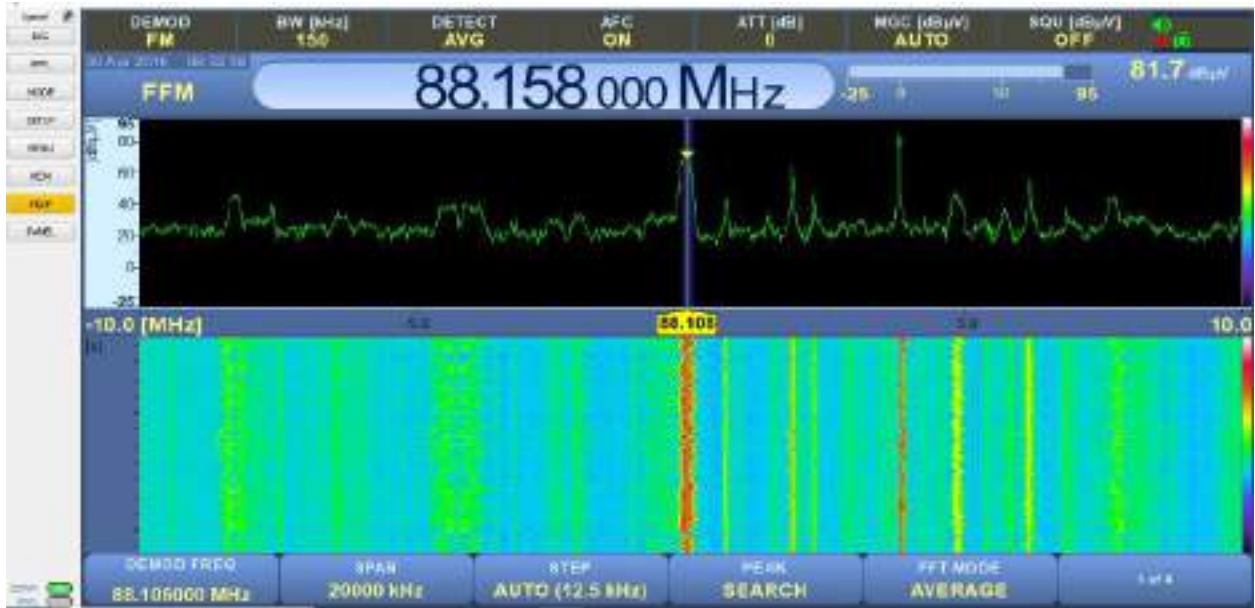
5. The details of the spectrum occupancy result are attached in **annexure 7**.
6. No illegal operations were detected so far in GSM 900 Band.
7. There is no out of band transmission from the GSM 900 transmitters. The detailed findings are attached in **annexure 7**.

7. Follow up

- i. Authority will continue monitoring the canceled RadioCommunication license in different places although illegal users were not found in recent monitoring in Haa and Paro..
- ii. We need to do the Spectrum Monitoring in Tsirang Monitoring Station for the VHF/UHF/HF ranges for any inception of the signal from within or outside the country.
- iii. Authority has to maintain the database for any spectrum signal detected during the monitoring from the outside country.
- iii. Authority will continue monitoring the spectrum occupancy for 2G, 3G, 4G and 5G in different places.
- iv. The authority will compare the fixed and mobile spectrum monitoring result with the frequency assigning database to see whether they are operating illegally or not.

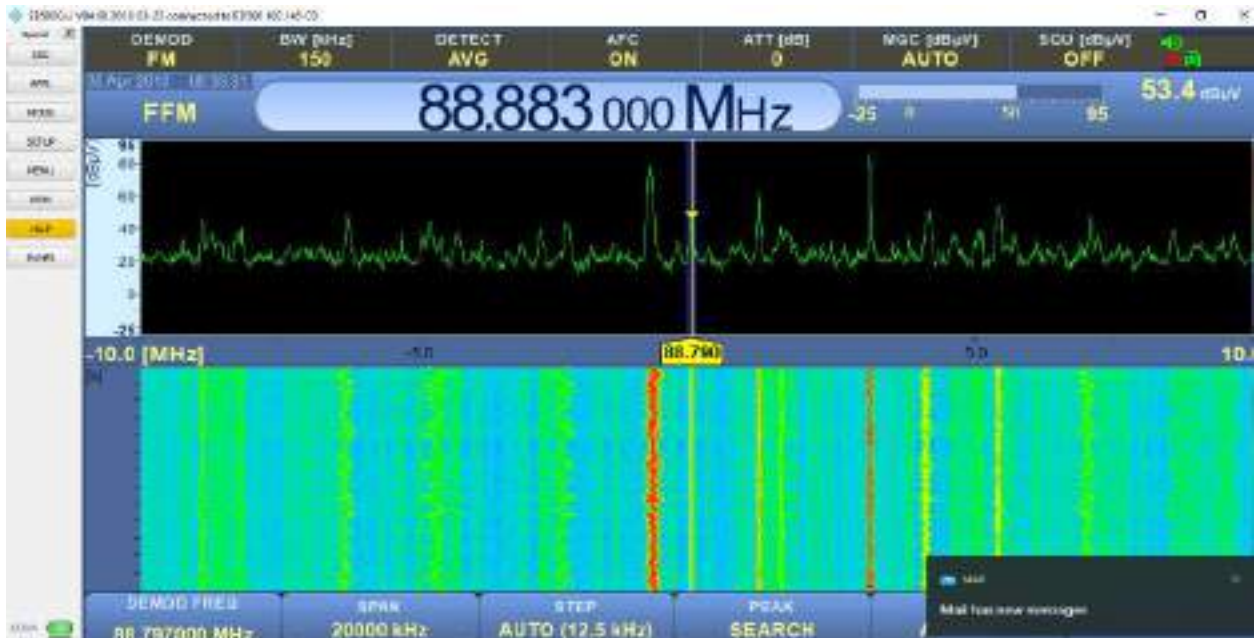
Annexures 1

The following shows the signal detected during the Fixed Spectrum Monitoring in Tsirang for FM transmitters.



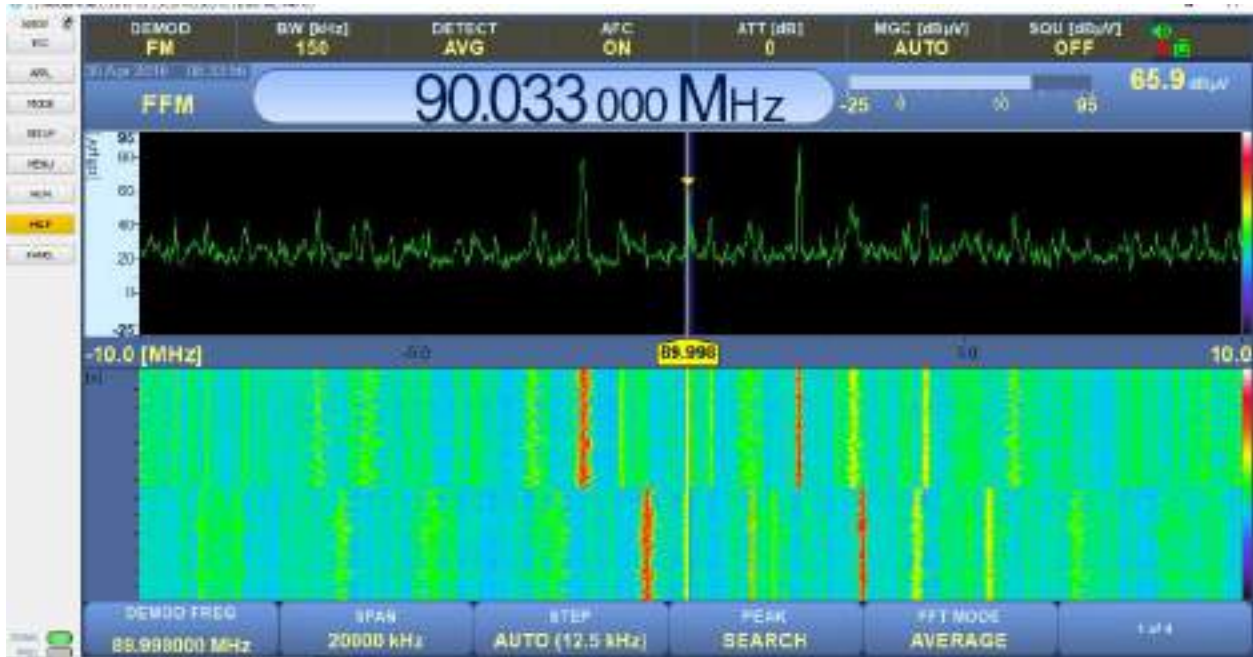
Name: Operating by BBS

Frequency Detected: 88.158 MHz



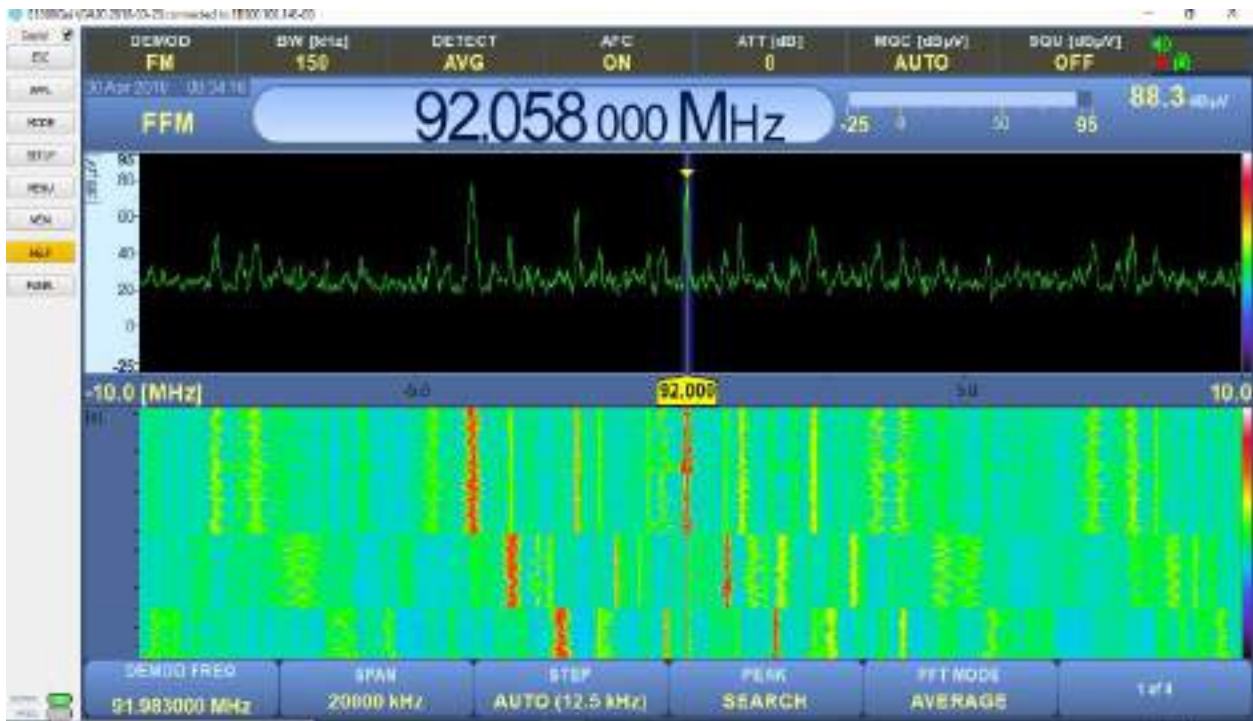
Operation: Operating by BBS

Frequency Detected: 88.883 MHz



Operation: Operating by BBS

Frequency Detected: 90.033 MHz



Operation: Operating by BBS

Frequency Detected: 92.058 MHz



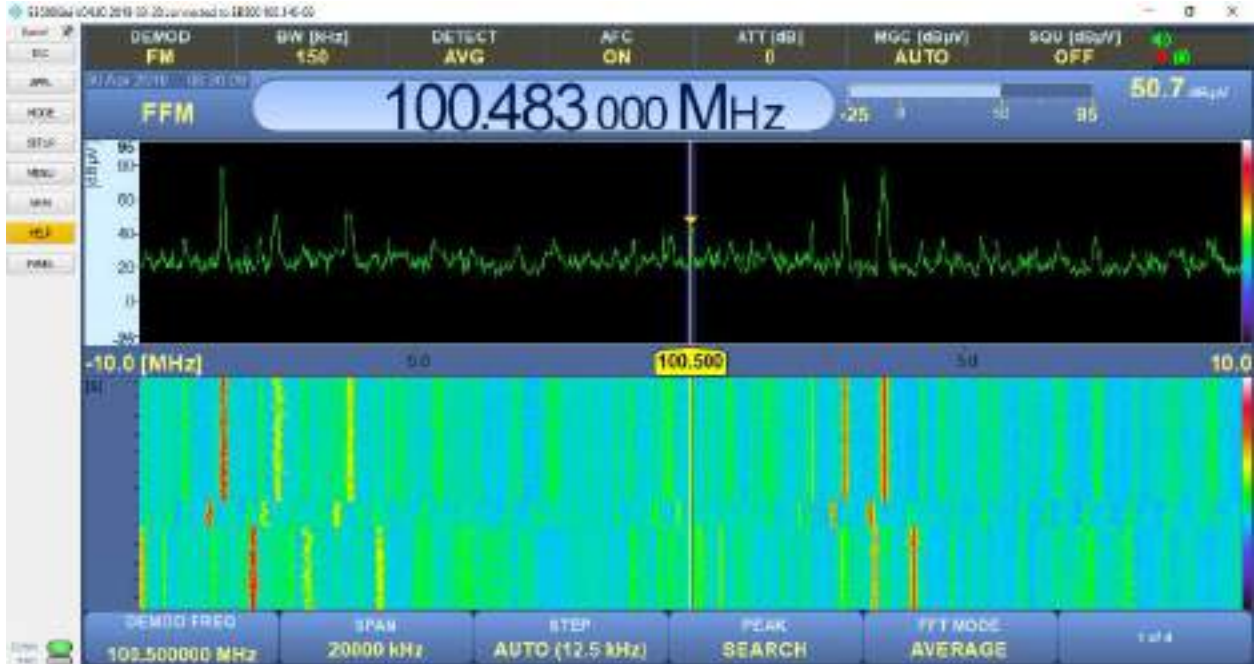
Operation: Operating by BBS

Frequency Detected: 93.033 MHz



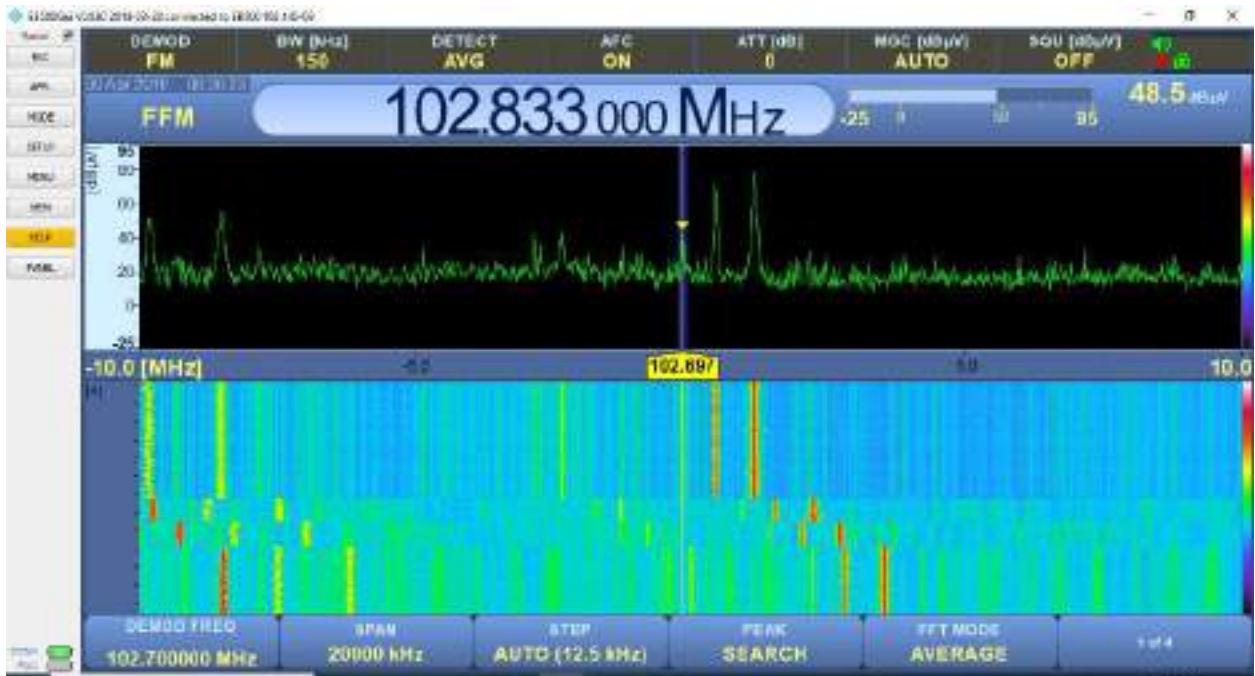
Operation: Operating by BBS

Frequency Detected: 94.233 MHz



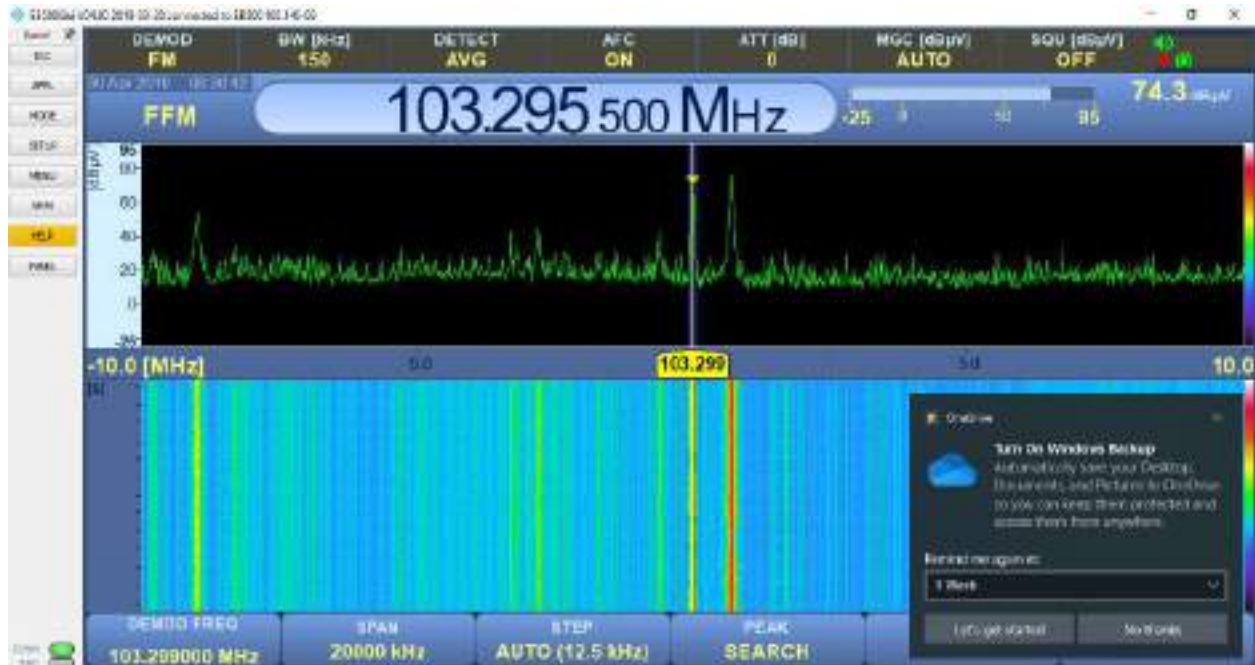
Operation: Operating by BBS

Frequency Detected: 100.483 MHz



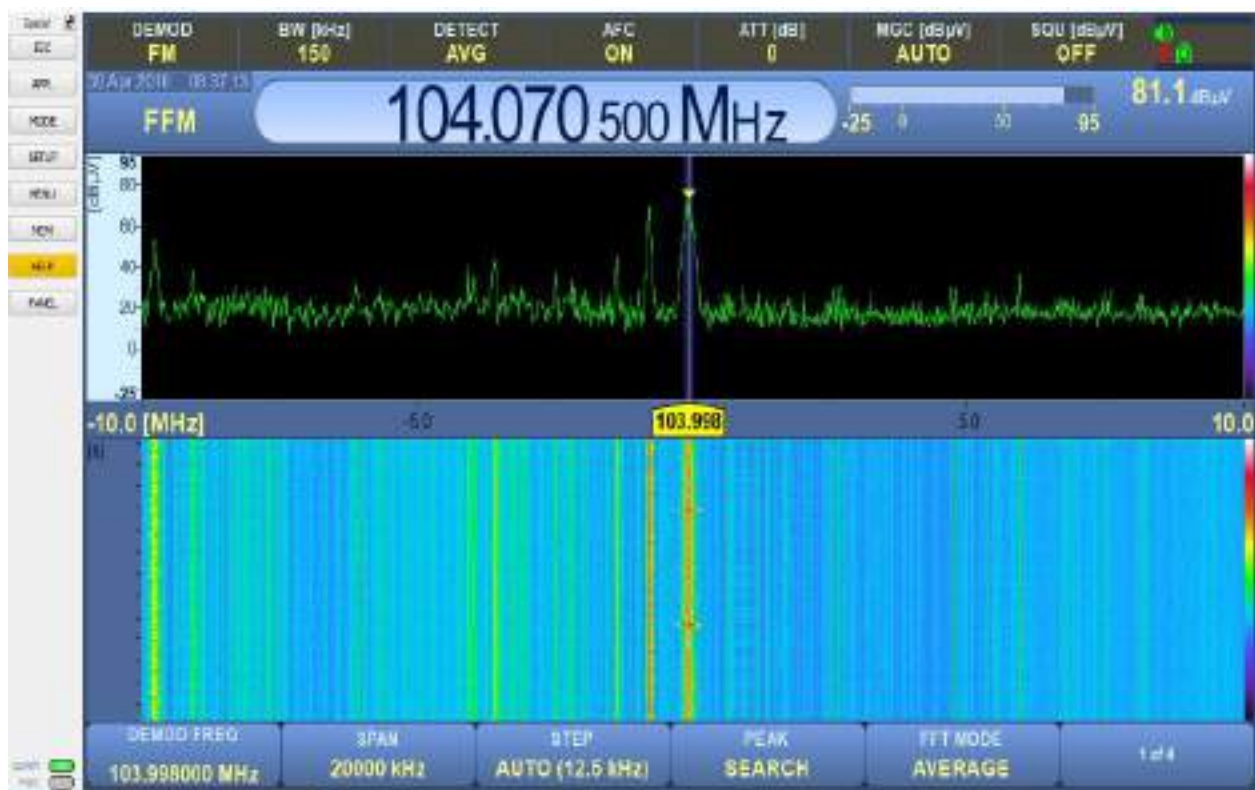
Operation: Operating by BBS

Frequency Detected: 102.833 MHz



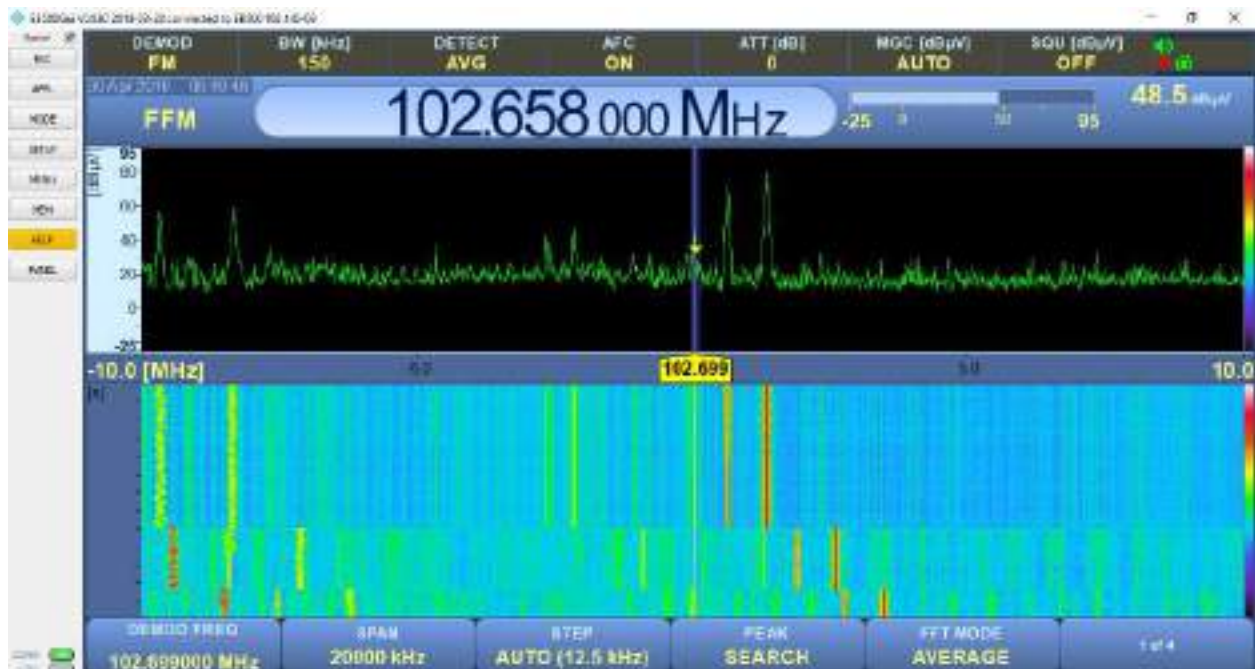
Operation: **Operating by Indian Broadcaster**

Frequency Detected: 103.295 MHz



Operation: **Operating by Kuzoo FM**

Frequency Detected: 104.070 MHz

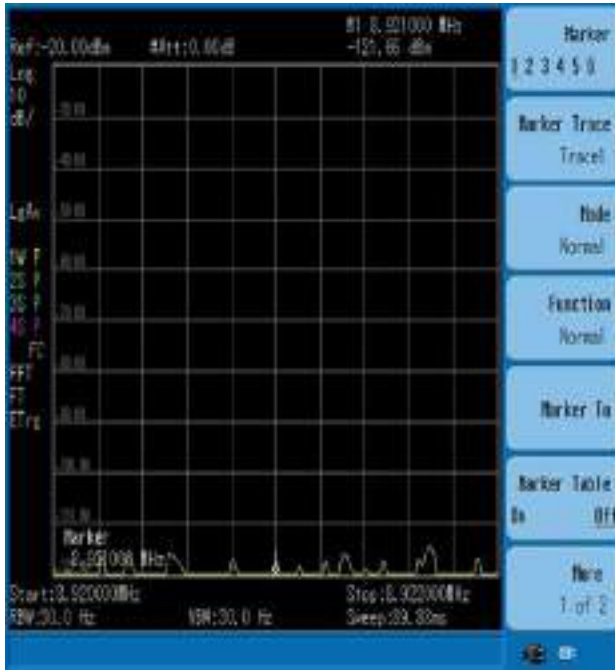


Operation: Operating by Indian Broadcaster

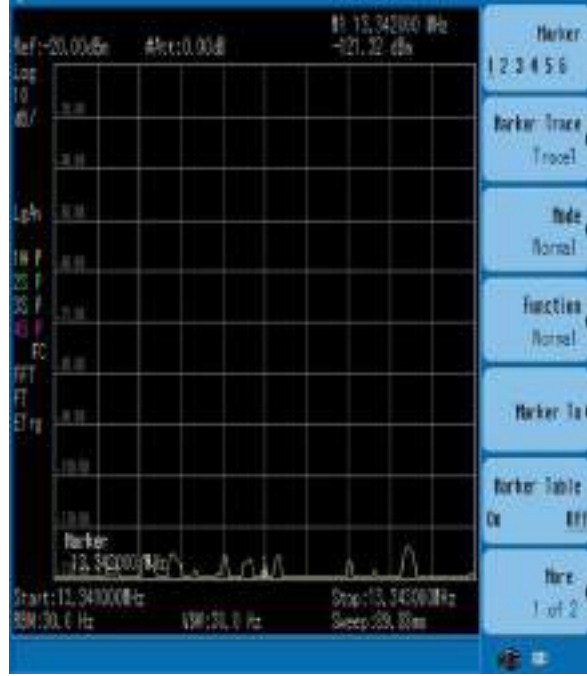
Frequency Detected: 102.258 MHz

Annexure 2

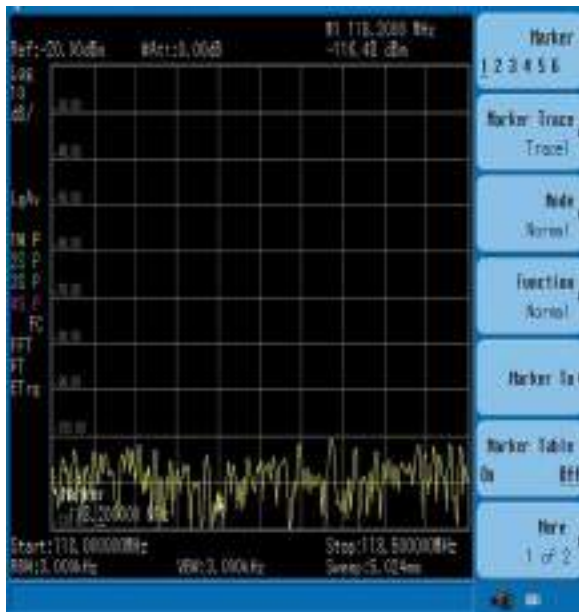
The figures showing the monitoring records from the Spectrum Analyzer for Spectrum apparatus canceled licenses all with particular spectrum frequency and area of operation.



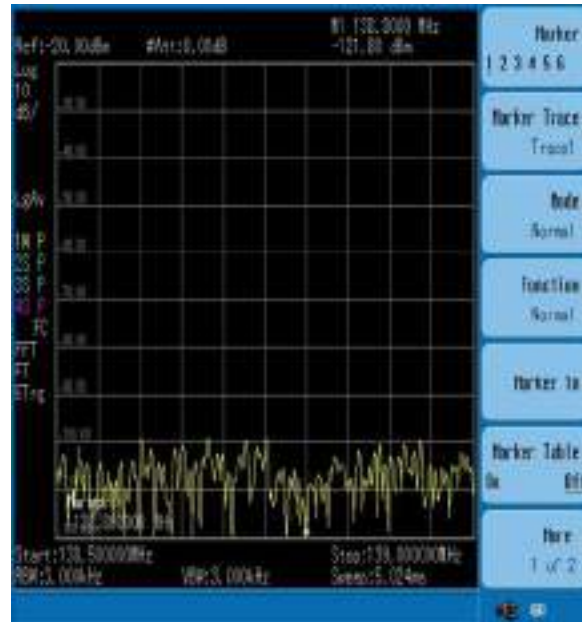
Name: Druk Air Corporation, Paro



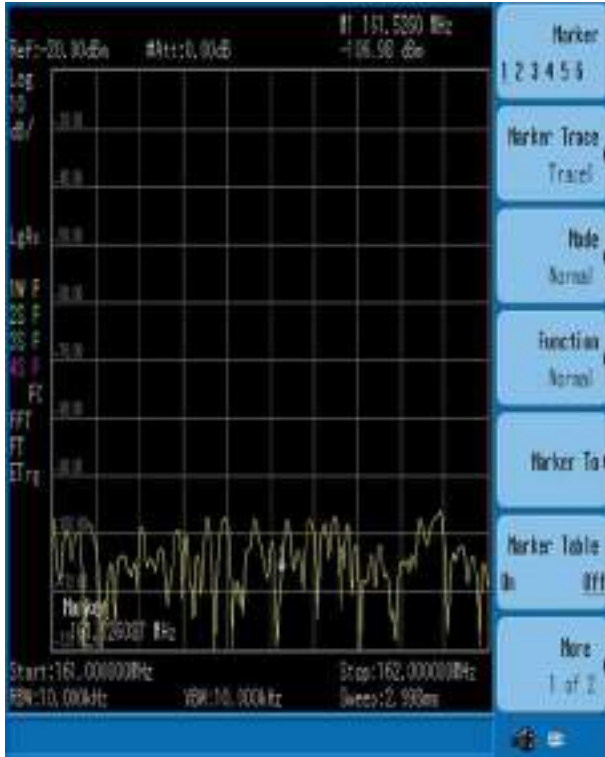
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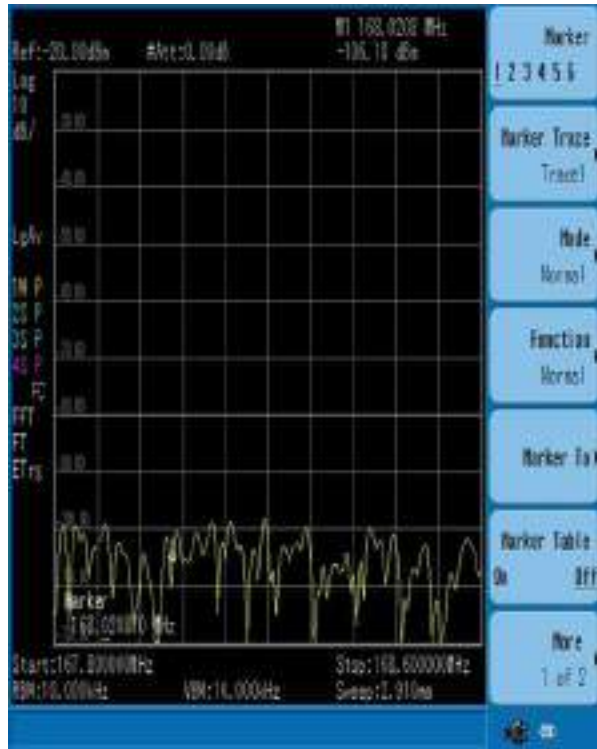
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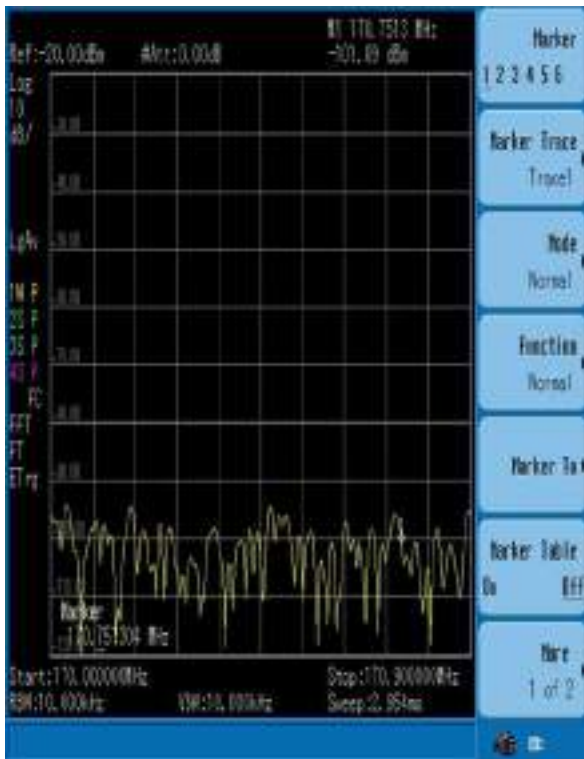
Name: Xplore Bhutan, Paro



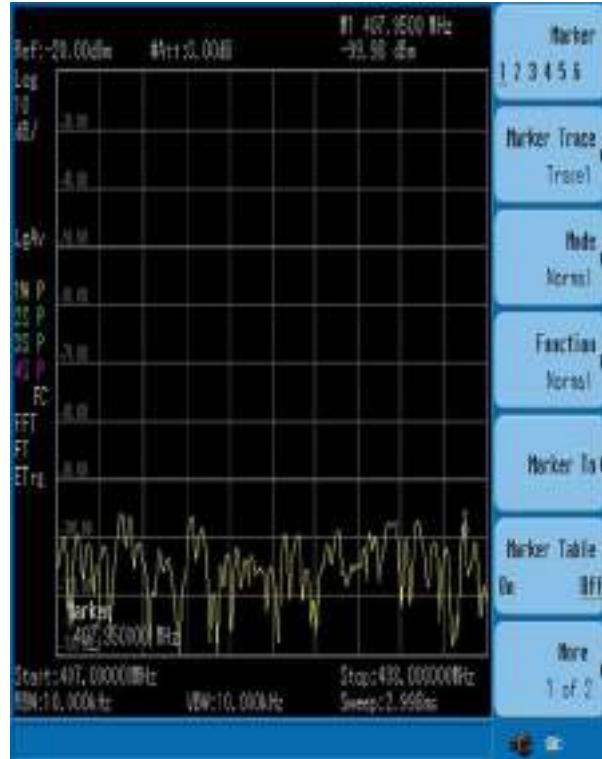
Name: Uma Como, Paro



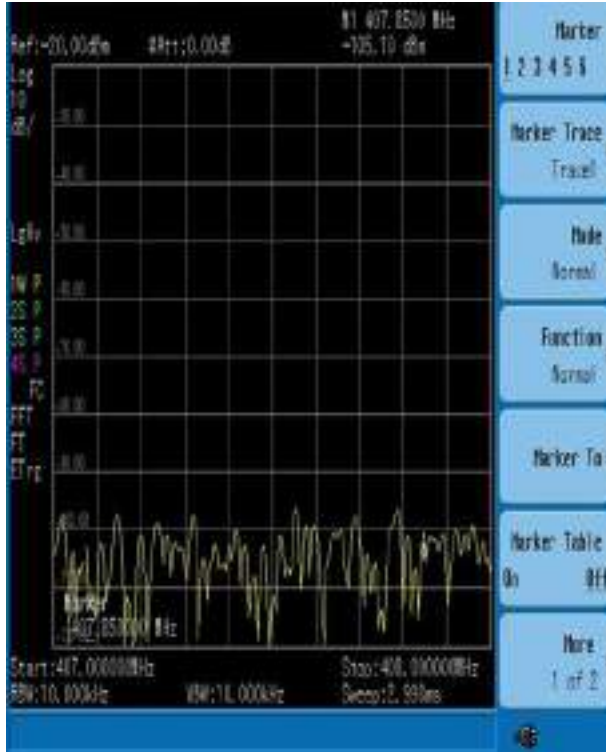
Name: Uma Como, Paro



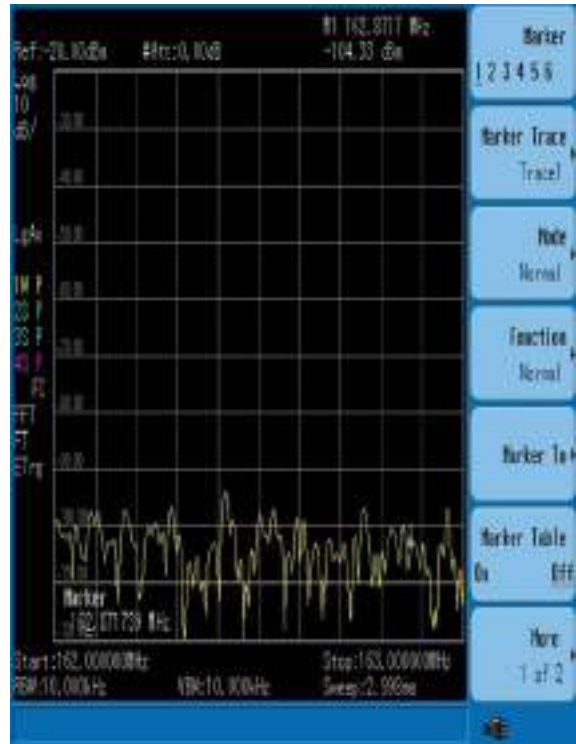
Name: Uma Como, Paro



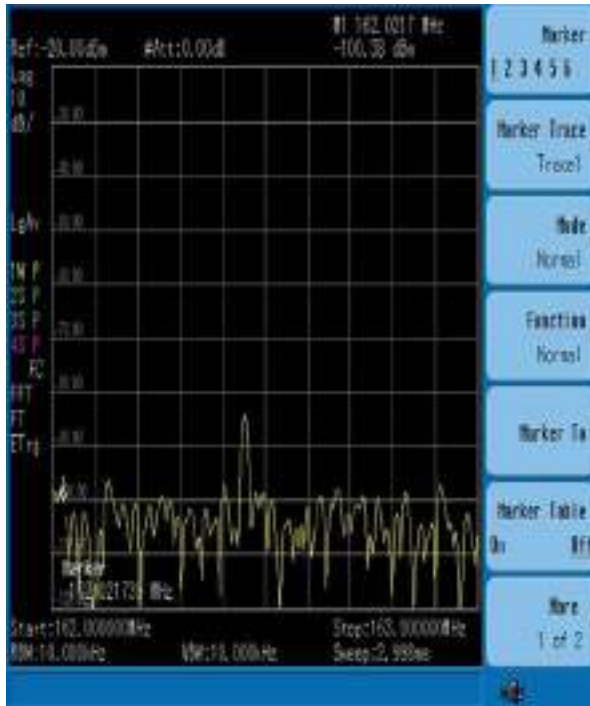
Name: ST Trading Import and Export, Paro



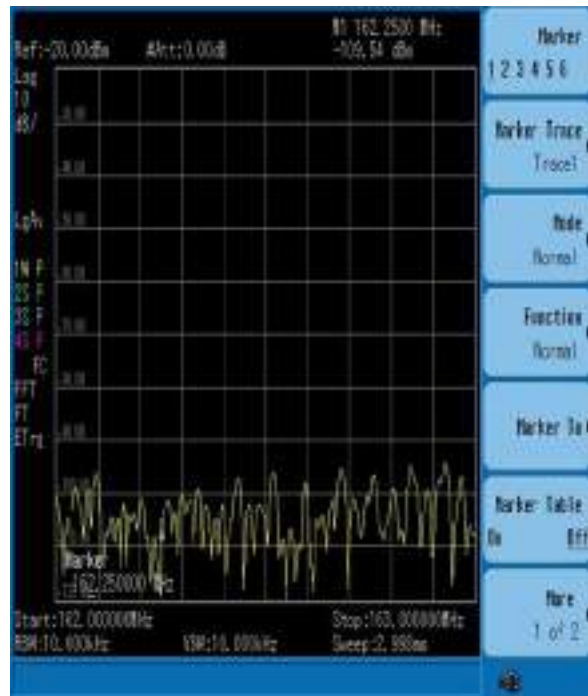
Name: Druk Lhayul Construction, Paro



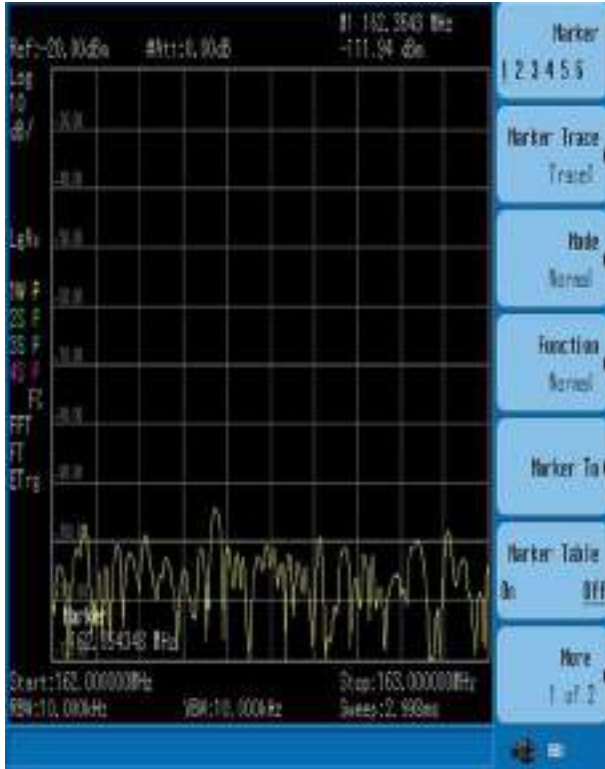
Name: Happiness Kingdom Travel, Paro



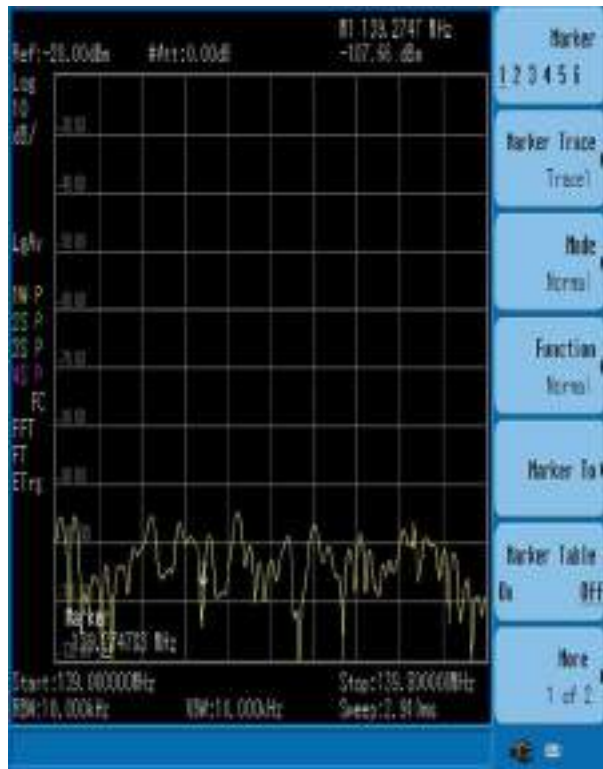
Name: Tashi Air Services, Paro



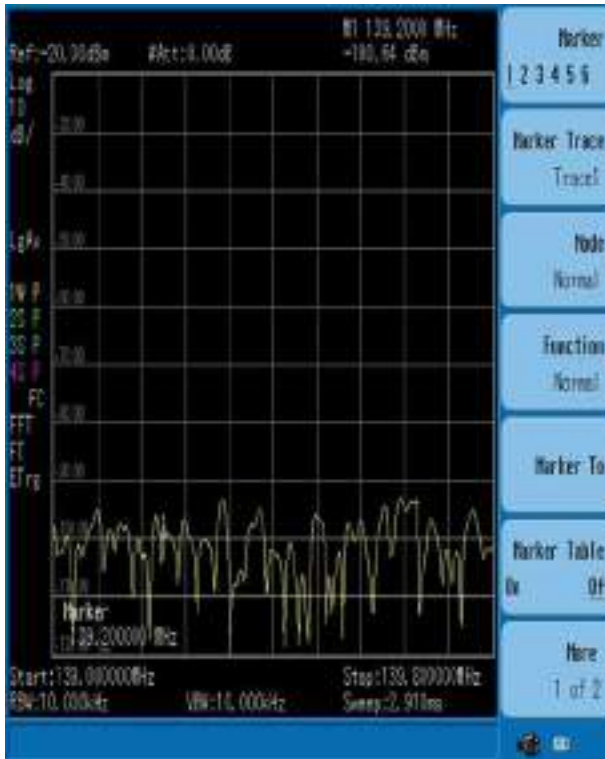
Name: Tashi Air Services, Paro



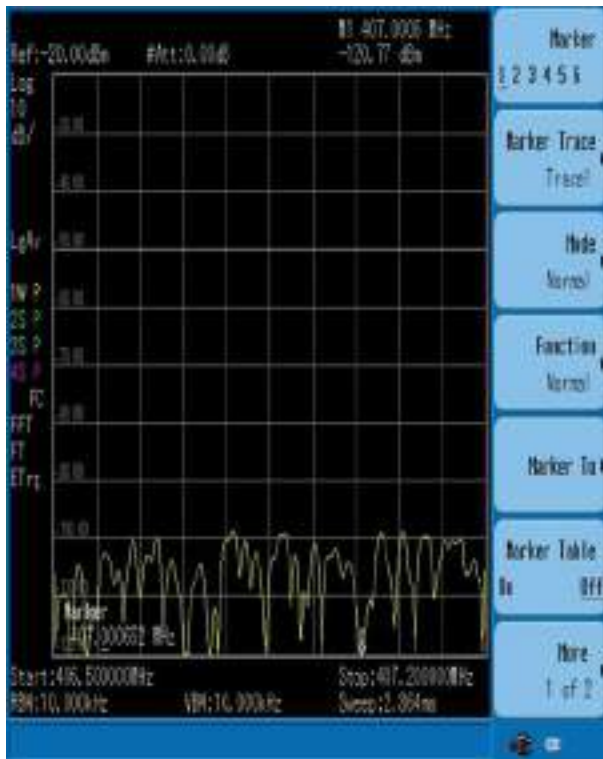
Name: Tashi Air Services, Paro



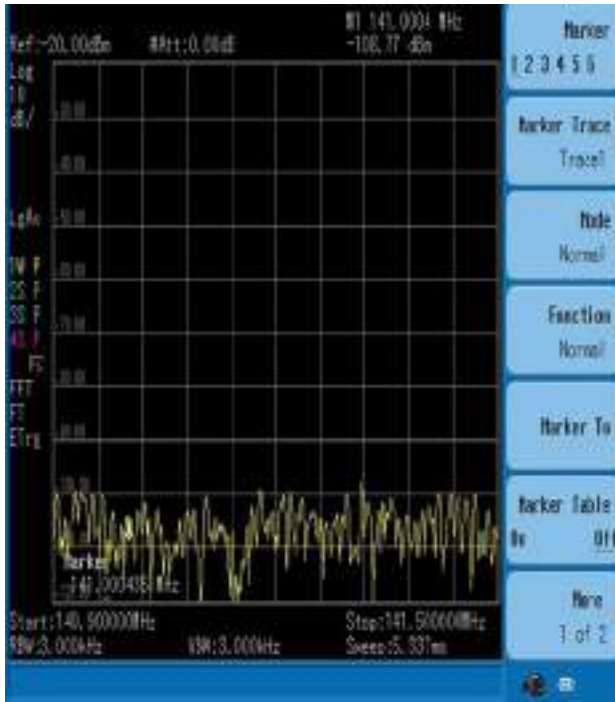
Name: Indo General Stores, Paro



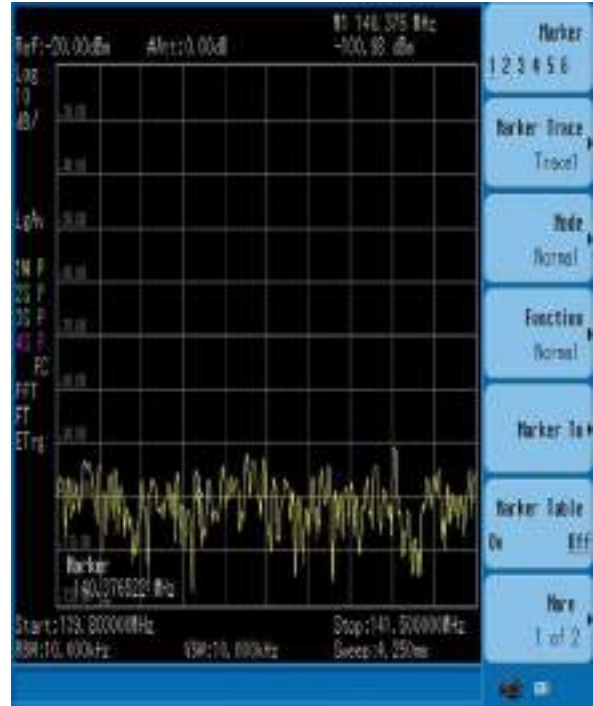
Name: Bhutan Venture Hospitality Six sense, Paro



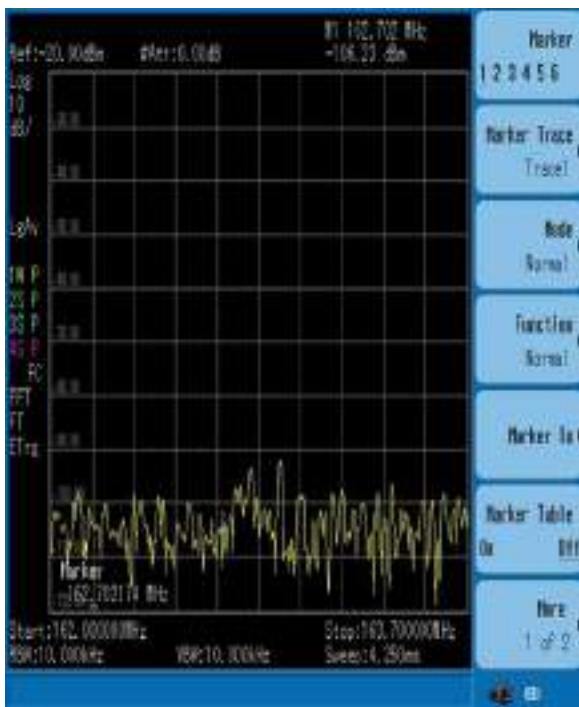
Name: Dekiling, Enterprise, Paro



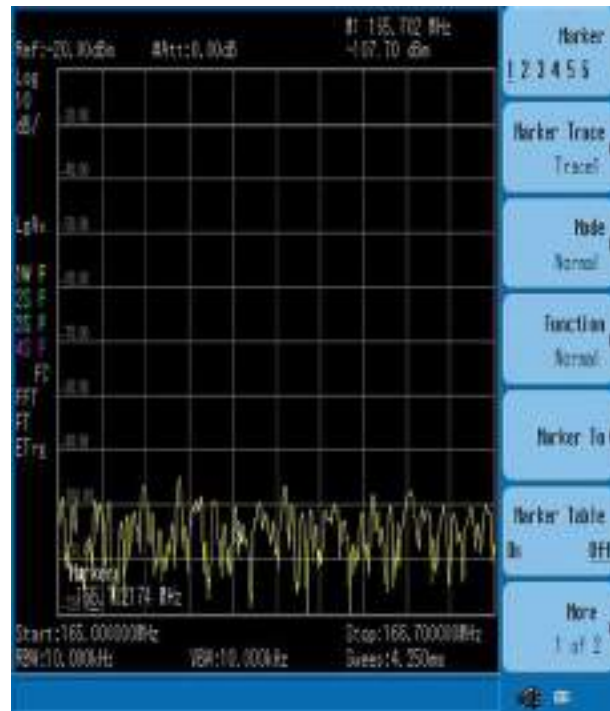
Name: Cee Dee Organic Mushroom Farm, Paro



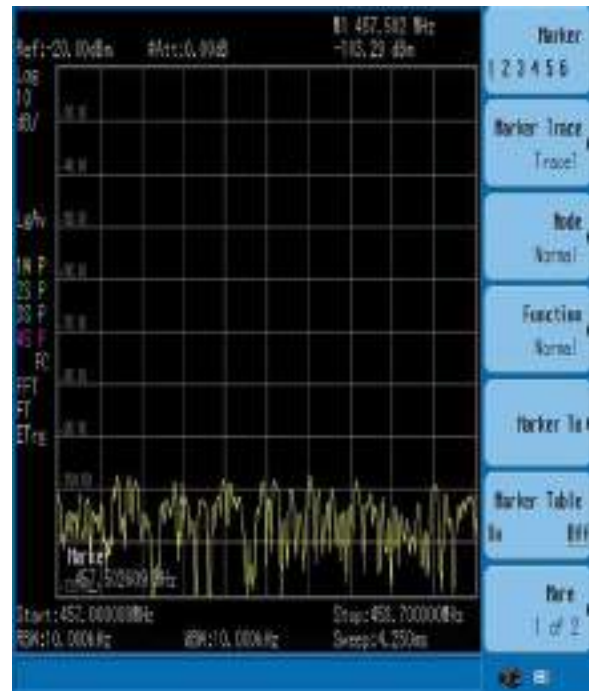
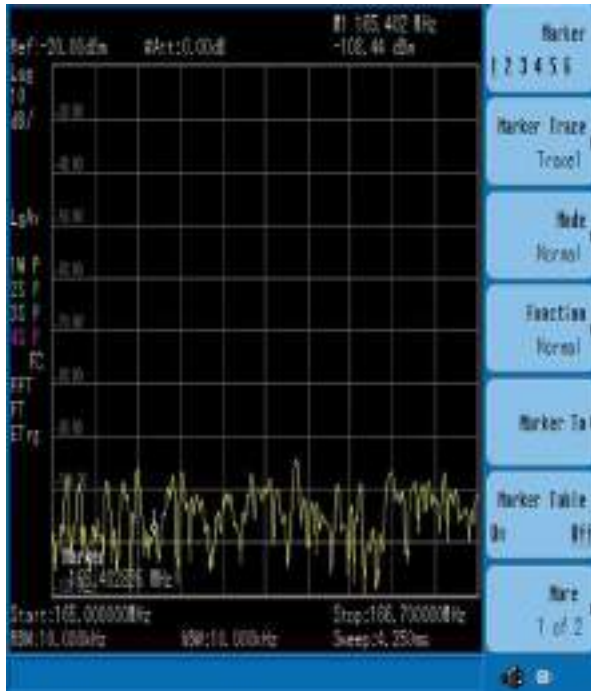
Name: Lhayul Construction, Haa



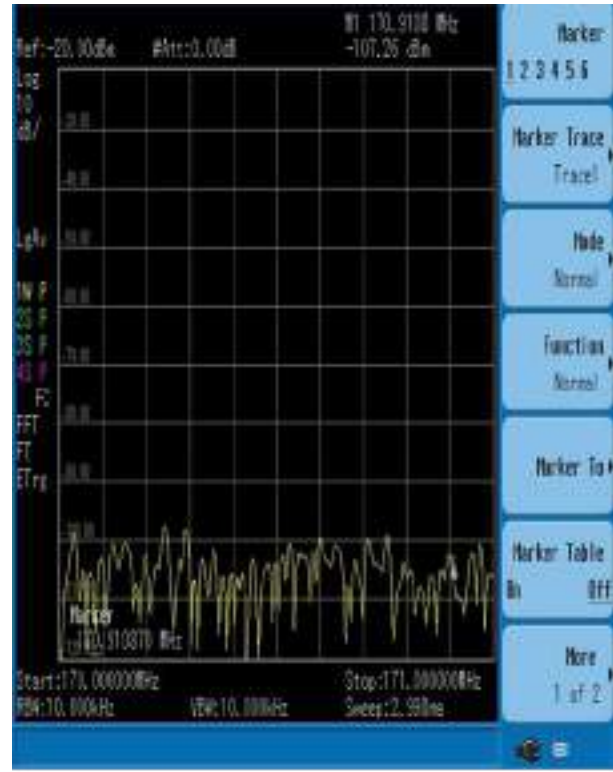
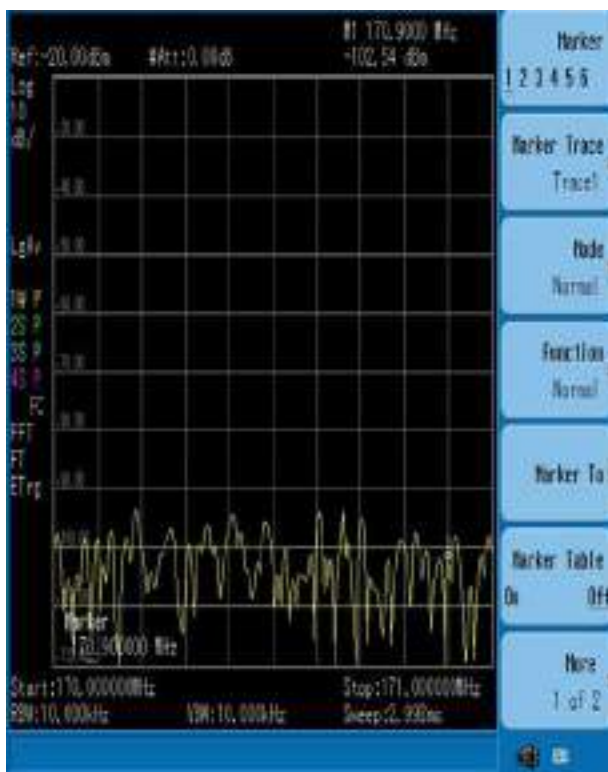
Name: Dzongkhag, Haa



Name: Chundu Namgay, Haa



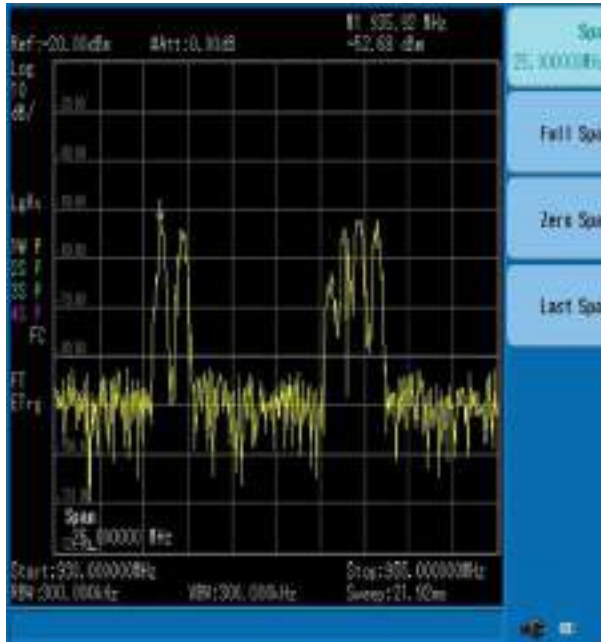
Name: Jigme Khesar Strict Nature Reserve, Haa Name: National Centre for Riverine, Haa



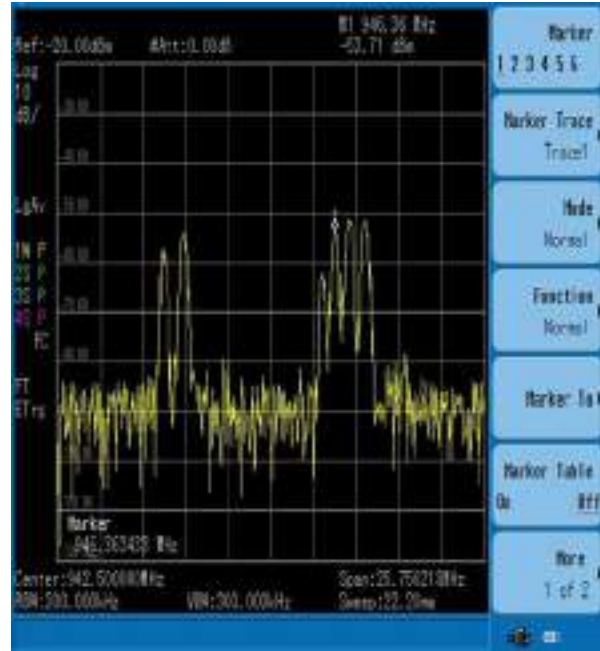
Name: Jigme Khesar Strict Nature Reserve, Haa Name: Jigme Khesar Strict Nature Reserve

Annexure 3

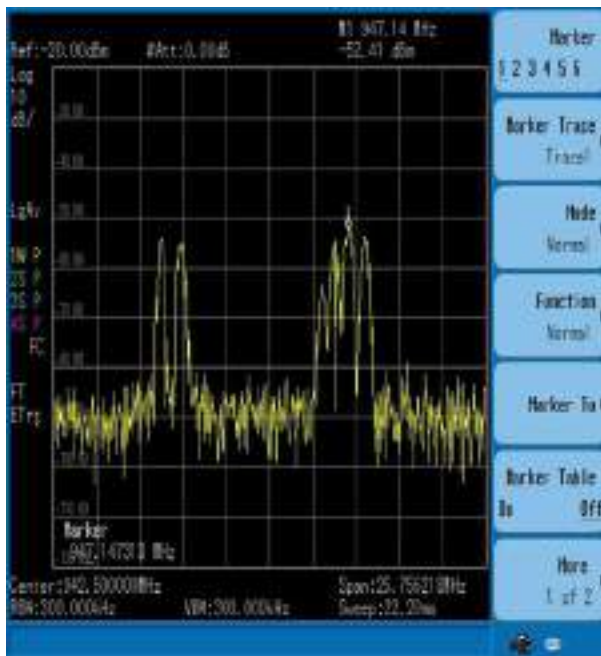
The figures show the monitoring records from the Spectrum Analyzer for Spectrum Occupancy monitoring with particular spectrum frequency.



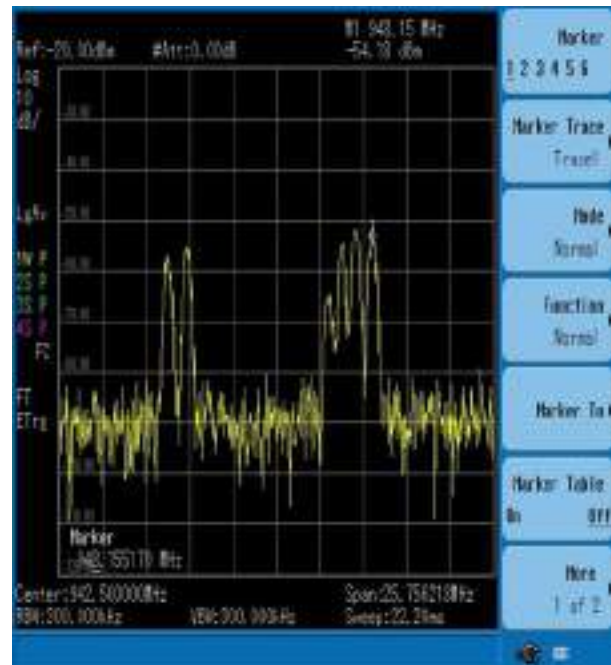
GSM 900 MHz band (BTL)



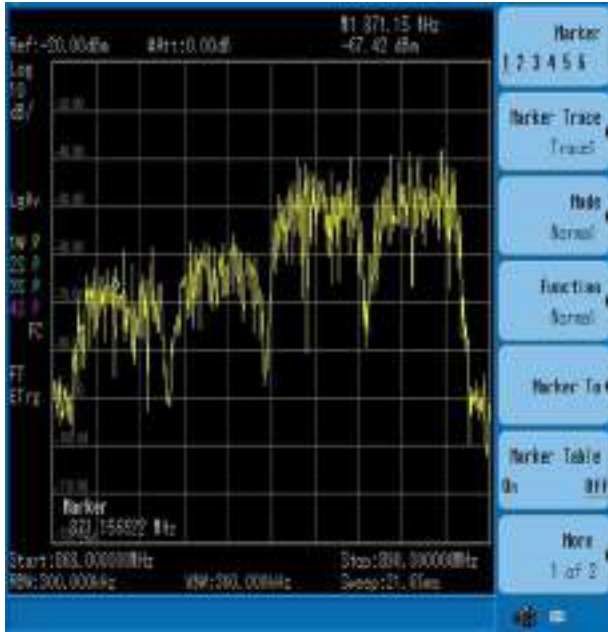
GSM 900 MHz band (BTL)



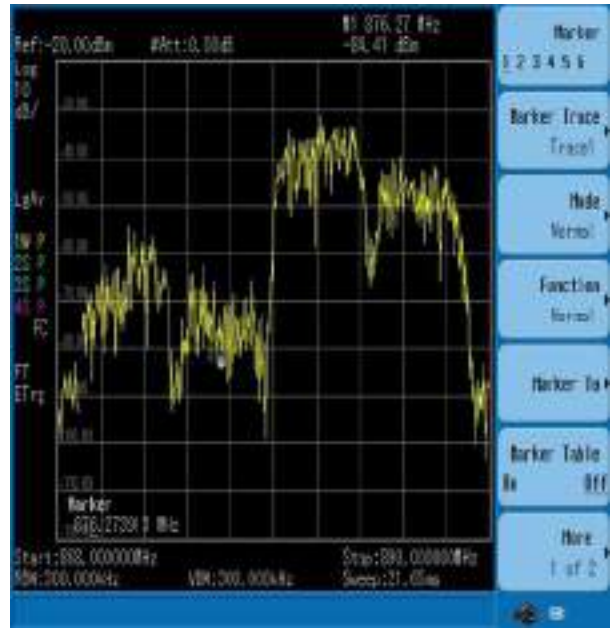
GSM 900 MHz band (BTL)



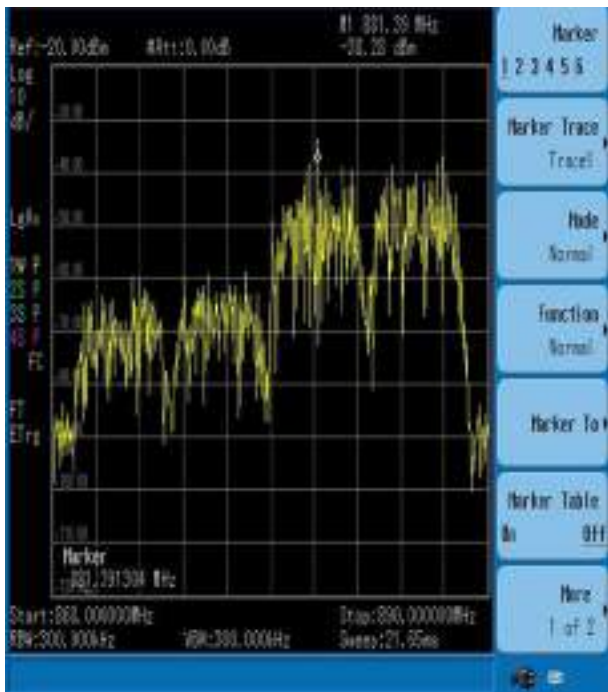
GSM 900 MHz band (BTL)



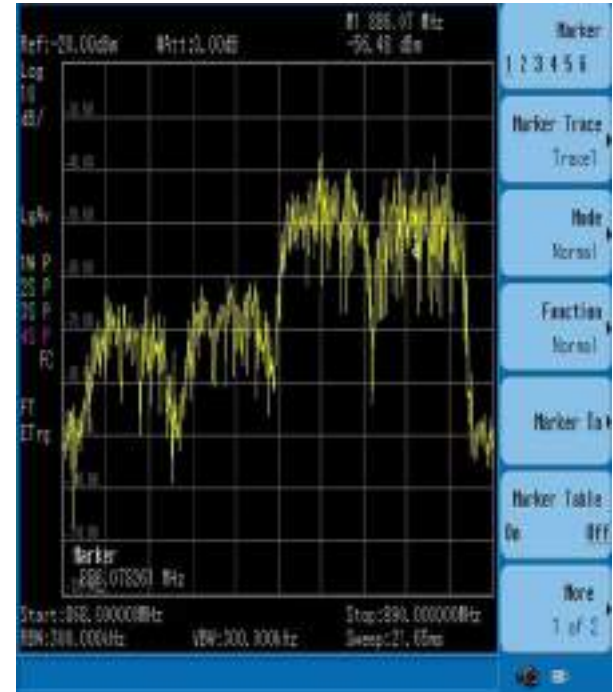
UMTS 850 MHz band (TICPL)



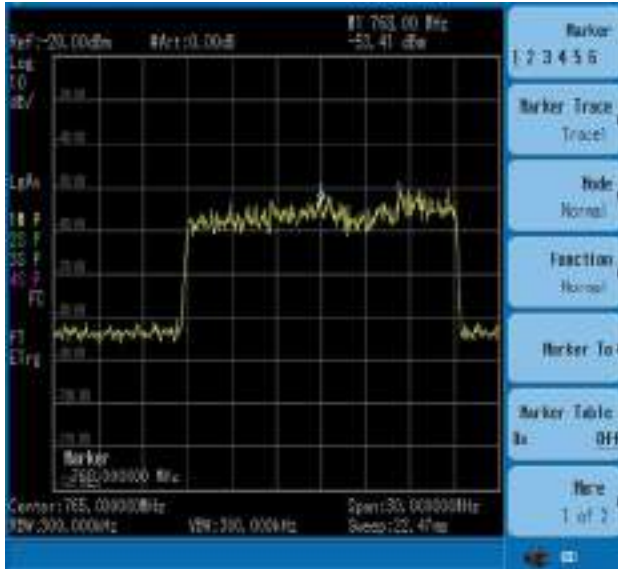
UMTS 850 MHz band (TICPL)



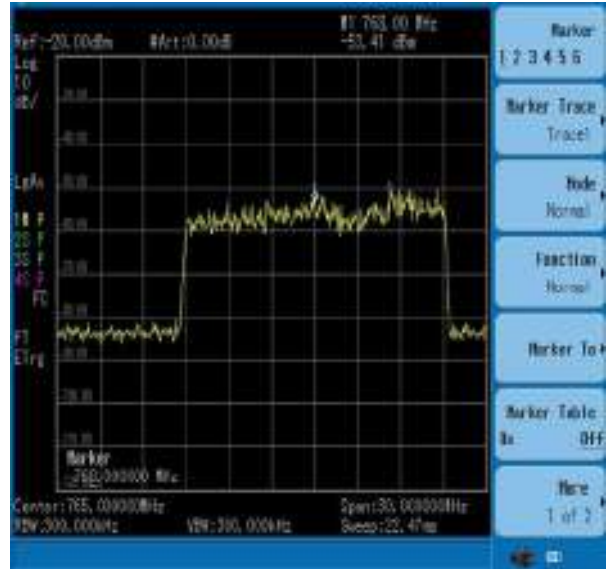
UMTS 850 MHz band (BTL)



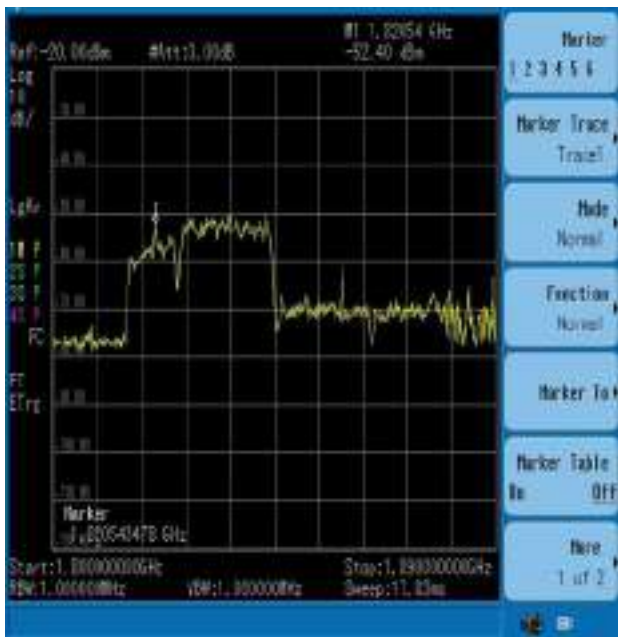
UMTS 850 MHz band (BTL)



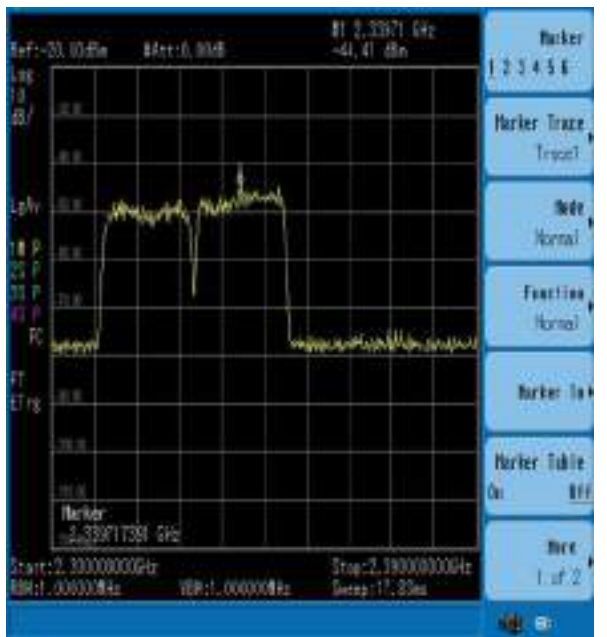
700 MHz band (TICPL)



700 MHz band (TICPL)



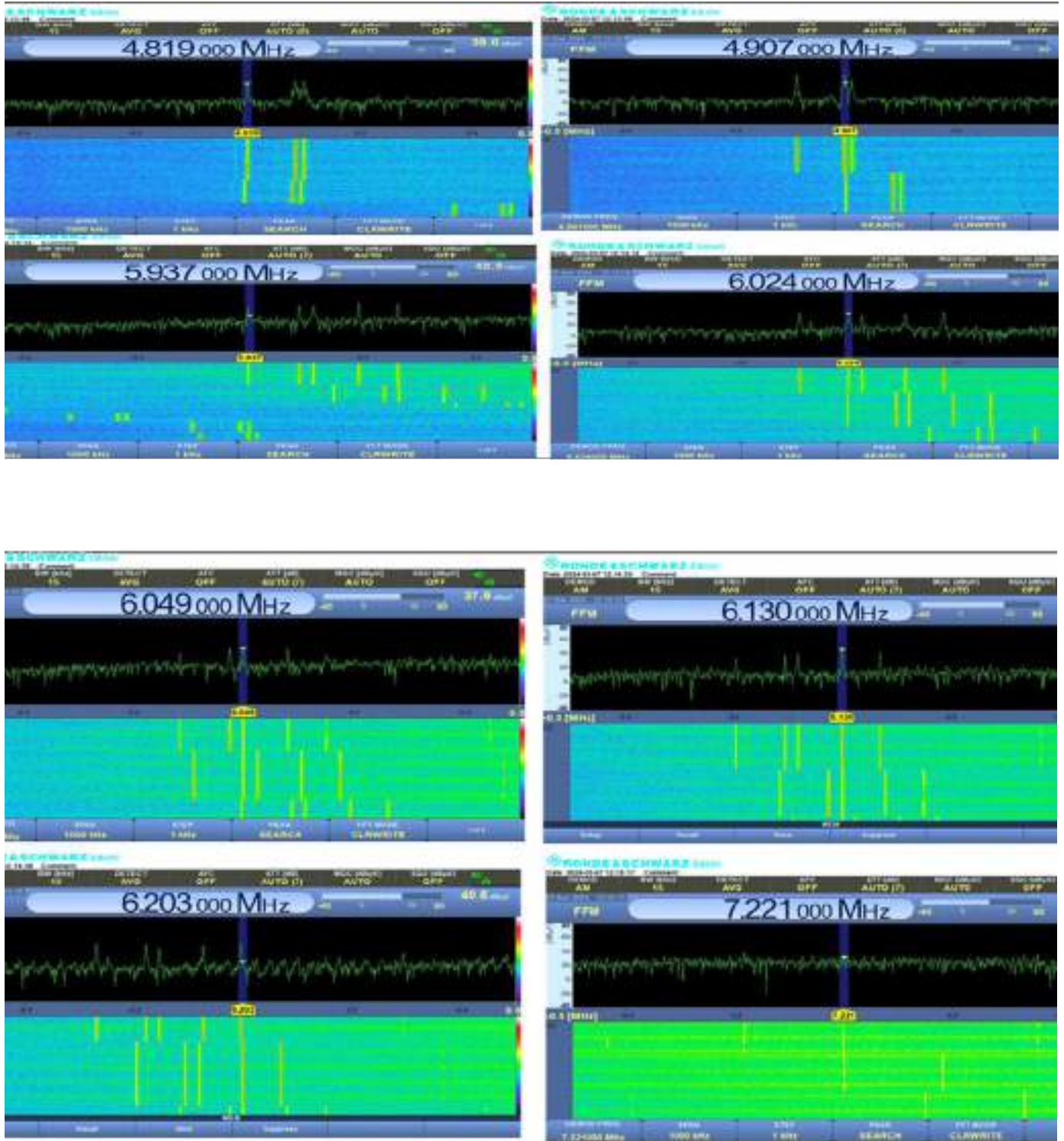
LTE 1800 MHz band (BTL)

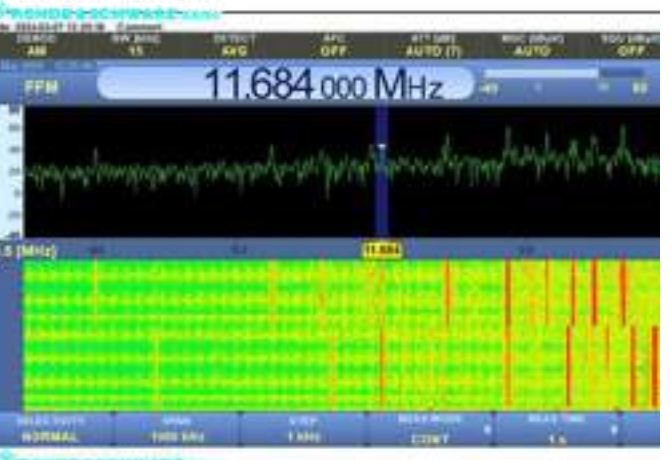


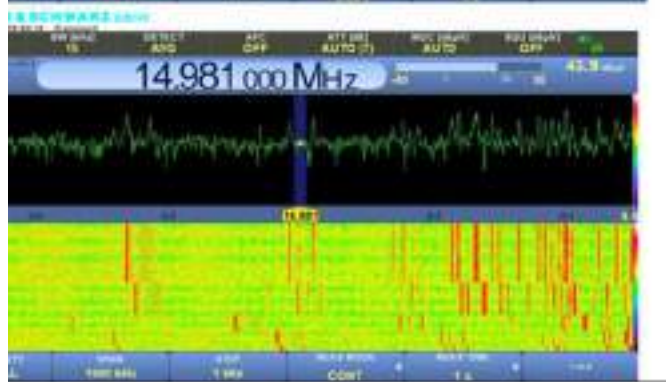
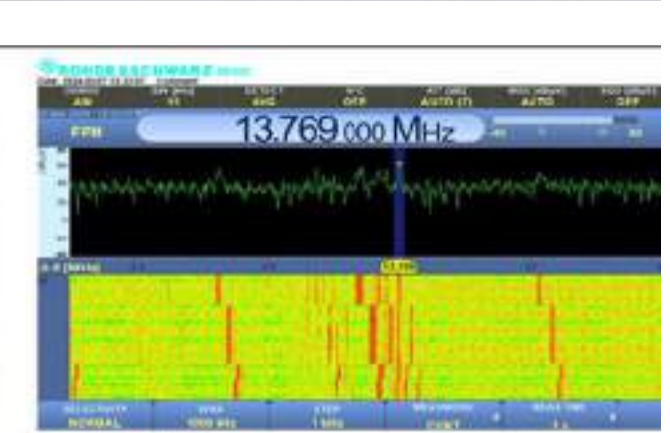
LTE 1800 MHz band (BTL)

Annexures 4

The following shows the signal detected during the Fixed Spectrum Monitoring in Tsirang for HF frequencies













Annexures 5

The following are the details of the system generated spectrum occupancy report monitoring for VHF frequency range 136-142 MHz from the fixed monitoring equipment.

Monitoring Station Data

Name: FMU308w_100305
Latitude: 89.6243057250977 °
Longitude: 27.4747543334961 °
Receiver: LS-RX-08-T

Type: FCO 5
Time Interval: 5 min
Channel Sets: VHF Monitoring

Measurement Receiver Settings

Name: VHF March 2024
Mode: Frequency Range
Freq. Range: 136.00 MHz - 142.00 MHz
RBW: 25.00 kHz
Step Width: 24.69 kHz
Start Time: 3/27/2024 4:00:00 AM
Stop Time: 3/27/2024 4:20:00 AM
Duration: 20 Minutes 0 Second

Attenuation: Auto

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S1	136.01 MHz	25.00 kHz	0	0	0
S2	136.04 MHz	25.00 kHz	0	0	0
S3	136.06 MHz	25.00 kHz	0	0	0
S4	136.09 MHz	25.00 kHz	0	0	0
S5	136.11 MHz	25.00 kHz	0	0	0
S6	136.14 MHz	25.00 kHz	0	0	0
S7	136.16 MHz	25.00 kHz	0	0	0

S8	136.19 MHz	25.00 kHz	0	0	0
S9	136.21 MHz	25.00 kHz	0	0	0
S10	136.24 MHz	25.00 kHz	0	0	0
S11	136.26 MHz	25.00 kHz	0	0	0
S12	136.29 MHz	25.00 kHz	0	0	0
S13	136.31 MHz	25.00 kHz	0	0	0
S14	136.34 MHz	25.00 kHz	0	0	0
S15	136.36 MHz	25.00 kHz	0	0	0
S16	136.39 MHz	25.00 kHz	0	0	0
S17	136.41 MHz	25.00 kHz	0	0	0
S18	136.44 MHz	25.00 kHz	0	0	0
S19	136.46 MHz	25.00 kHz	0	0	0
S20	136.49 MHz	25.00 kHz	0	0	0
S21	136.51 MHz	25.00 kHz	0	0	0
S22	136.54 MHz	25.00 kHz	0	0	0
S23	136.56 MHz	25.00 kHz	0	0	0
S24	136.59 MHz	25.00 kHz	0	0	0
S25	136.61 MHz	25.00 kHz	0	0	0
S26	136.64 MHz	25.00 kHz	0	0	0
S27	136.66 MHz	25.00 kHz	0	0	0
S28	136.69 MHz	25.00 kHz	0	0	0
S29	136.71 MHz	25.00 kHz	0	0	0
S30	136.74 MHz	25.00 kHz	0	0	0
S31	136.76 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S32	136.79 MHz	25.00 kHz	0	0	0
S33	136.81 MHz	25.00 kHz	0	0	0
S34	136.84 MHz	25.00 kHz	0	0	0
S35	136.86 MHz	25.00 kHz	0	0	0
S36	136.89 MHz	25.00 kHz	0	0	0
S37	136.91 MHz	25.00 kHz	0	0	0
S38	136.94 MHz	25.00 kHz	0	0	0

S39	136.96 MHz	25.00 kHz	0	0	0
S40	136.99 MHz	25.00 kHz	0	0	0
S41	137.01 MHz	25.00 kHz	0	0	0
S42	137.04 MHz	25.00 kHz	0	0	0
S43	137.06 MHz	25.00 kHz	0	0	0
S44	137.09 MHz	25.00 kHz	0	0	0
S45	137.11 MHz	25.00 kHz	0	0	0
S46	137.14 MHz	25.00 kHz	0	0	0
S47	137.16 MHz	25.00 kHz	0	0	0
S48	137.19 MHz	25.00 kHz	0	0	0
S49	137.21 MHz	25.00 kHz	0	0	0
S50	137.24 MHz	25.00 kHz	0	0	0
S51	137.26 MHz	25.00 kHz	0	0	0
S52	137.29 MHz	25.00 kHz	0	0	0
S53	137.31 MHz	25.00 kHz	0	0	0
S54	137.34 MHz	25.00 kHz	0	0	0
S55	137.36 MHz	25.00 kHz	0	0	0
S56	137.39 MHz	25.00 kHz	0	0	0
S57	137.41 MHz	25.00 kHz	0	0	0
S58	137.44 MHz	25.00 kHz	0	0	0
S59	137.46 MHz	25.00 kHz	0	0	0
S60	137.49 MHz	25.00 kHz	0	0	0
S61	137.51 MHz	25.00 kHz	0	0	0
S62	137.54 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S63	137.56 MHz	25.00 kHz	0	0	0
S64	137.59 MHz	25.00 kHz	0	0	0
S65	137.61 MHz	25.00 kHz	0	0	0
S66	137.64 MHz	25.00 kHz	0	0	0
S67	137.66 MHz	25.00 kHz	0	0	0
S68	137.69 MHz	25.00 kHz	0	0	0

S69	137.71 MHz	25.00 kHz	0	0	0
S70	137.74 MHz	25.00 kHz	0	0	0
S71	137.76 MHz	25.00 kHz	0	0	0
S72	137.79 MHz	25.00 kHz	0	0	0
S73	137.81 MHz	25.00 kHz	0	0	0
S74	137.84 MHz	25.00 kHz	0	0	0
S75	137.86 MHz	25.00 kHz	0	0	0
S76	137.89 MHz	25.00 kHz	0	0	0
S77	137.91 MHz	25.00 kHz	0	0	0
S78	137.94 MHz	25.00 kHz	0	0	0
S79	137.96 MHz	25.00 kHz	0	0	0
S80	137.99 MHz	25.00 kHz	0	0	0
S81	138.01 MHz	25.00 kHz	0	0	0
S82	138.04 MHz	25.00 kHz	0	0	0
S83	138.06 MHz	25.00 kHz	0	0	0
S84	138.09 MHz	25.00 kHz	0	0	0
S85	138.11 MHz	25.00 kHz	0	0	0
S86	138.14 MHz	25.00 kHz	0	0	0
S87	138.16 MHz	25.00 kHz	0	0	0
S88	138.19 MHz	25.00 kHz	0	0	0
S89	138.21 MHz	25.00 kHz	0	0	0
S90	138.24 MHz	25.00 kHz	0	0	0
S91	138.26 MHz	25.00 kHz	0	0	0
S92	138.29 MHz	25.00 kHz	0	0	0
S93	138.31 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S94	138.34 MHz	25.00 kHz	0	0	0
S95	138.36 MHz	25.00 kHz	0	0	0
S96	138.39 MHz	25.00 kHz	0	0	0
S97	138.41 MHz	25.00 kHz	0	0	0
S98	138.44 MHz	25.00 kHz	0	0	0

S99	138.46 MHz	25.00 kHz	0	0	0
S100	138.49 MHz	25.00 kHz	0	0	0
S101	138.51 MHz	25.00 kHz	0	0	0
S102	138.54 MHz	25.00 kHz	0	0	0
S103	138.56 MHz	25.00 kHz	0	0	0
S104	138.59 MHz	25.00 kHz	0	0	0
S105	138.61 MHz	25.00 kHz	0	0	0
S106	138.64 MHz	25.00 kHz	0	0	0
S107	138.66 MHz	25.00 kHz	0	0	0
S108	138.69 MHz	25.00 kHz	0	0	0
S109	138.71 MHz	25.00 kHz	0	0	0
S110	138.74 MHz	25.00 kHz	0	0	0
S111	138.76 MHz	25.00 kHz	0	0	0
S112	138.79 MHz	25.00 kHz	0	0	0
S113	138.81 MHz	25.00 kHz	0	0	0
S114	138.84 MHz	25.00 kHz	0	0	0
S115	138.86 MHz	25.00 kHz	0	0	0
S116	138.89 MHz	25.00 kHz	0	0	0
S117	138.91 MHz	25.00 kHz	0	0	0
S118	138.94 MHz	25.00 kHz	0	0	0
S119	138.96 MHz	25.00 kHz	0	0	0
S120	138.99 MHz	25.00 kHz	0	0	0
S121	139.01 MHz	25.00 kHz	0	0	0
S122	139.04 MHz	25.00 kHz	0	0	0
S123	139.06 MHz	25.00 kHz	0	0	0
S124	139.09 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S125	139.11 MHz	25.00 kHz	0	0	0
S126	139.14 MHz	25.00 kHz	0	0	0
S127	139.16 MHz	25.00 kHz	0	0	0
S128	139.19 MHz	25.00 kHz	0	0	0
S129	139.21 MHz	25.00 kHz	0	0	0

S130	139.24 MHz	25.00 kHz	0	0	0
S131	139.26 MHz	25.00 kHz	0	0	0
S132	139.29 MHz	25.00 kHz	0	0	0
S133	139.31 MHz	25.00 kHz	0	0	0
S134	139.34 MHz	25.00 kHz	0	0	0
S135	139.36 MHz	25.00 kHz	0	0	0
S136	139.39 MHz	25.00 kHz	0	0	0
S137	139.41 MHz	25.00 kHz	0	0	0
S138	139.44 MHz	25.00 kHz	0	0	0
S139	139.46 MHz	25.00 kHz	0	0	0
S140	139.49 MHz	25.00 kHz	0	0	0
S141	139.51 MHz	25.00 kHz	0	0	0
S142	139.54 MHz	25.00 kHz	0	0	0
S143	139.56 MHz	25.00 kHz	0	0	0
S144	139.59 MHz	25.00 kHz	0	0	0
S145	139.61 MHz	25.00 kHz	0	0	0
S146	139.64 MHz	25.00 kHz	0	0	0
S147	139.66 MHz	25.00 kHz	0	0	0
S148	139.69 MHz	25.00 kHz	0	0	0
S149	139.71 MHz	25.00 kHz	0	0	0
S150	139.74 MHz	25.00 kHz	0	0	0
S151	139.76 MHz	25.00 kHz	0	0	0
S152	139.79 MHz	25.00 kHz	0	0	0
S153	139.81 MHz	25.00 kHz	0	0	0
S154	139.84 MHz	25.00 kHz	0	0	0
S155	139.86 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S156	139.89 MHz	25.00 kHz	0	0	0
S157	139.91 MHz	25.00 kHz	0	0	0
S158	139.94 MHz	25.00 kHz	0	0	0

S159	139.96 MHz	25.00 kHz	0	0	0
S160	139.99 MHz	25.00 kHz	0	0	0
S161	140.01 MHz	25.00 kHz	0	0	0
S162	140.04 MHz	25.00 kHz	0	0	0
S163	140.06 MHz	25.00 kHz	0	0	0
S164	140.09 MHz	25.00 kHz	0	0	0
S165	140.11 MHz	25.00 kHz	0	0	0
S166	140.14 MHz	25.00 kHz	0	0	0
S167	140.16 MHz	25.00 kHz	0	0	0
S168	140.19 MHz	25.00 kHz	0	0	0
S169	140.21 MHz	25.00 kHz	0	0	0
S170	140.24 MHz	25.00 kHz	0	0	0
S171	140.26 MHz	25.00 kHz	0	0	0
S172	140.29 MHz	25.00 kHz	0	0	0
S173	140.31 MHz	25.00 kHz	0	0	0
S174	140.34 MHz	25.00 kHz	0	0	0
S175	140.36 MHz	25.00 kHz	0	0	0
S176	140.39 MHz	25.00 kHz	0	0	0
S177	140.41 MHz	25.00 kHz	0	0	0
S178	140.44 MHz	25.00 kHz	0	0	0
S179	140.46 MHz	25.00 kHz	0	0	0
S180	140.49 MHz	25.00 kHz	0	0	0
S181	140.51 MHz	25.00 kHz	0	0	0
S182	140.54 MHz	25.00 kHz	0	0	0
S183	140.56 MHz	25.00 kHz	0	0	0
S184	140.59 MHz	25.00 kHz	0	0	0
S185	140.61 MHz	25.00 kHz	0	0	0
S186	140.64 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S187	140.66 MHz	25.00 kHz	0	0	0
S188	140.69 MHz	25.00 kHz	0	0	0
S189	140.71 MHz	25.00 kHz	0	0	0

S190	140.74 MHz	25.00 kHz	0	0	0
S191	140.76 MHz	25.00 kHz	0	0	0
S192	140.79 MHz	25.00 kHz	0	0	0
S193	140.81 MHz	25.00 kHz	0	0	0
S194	140.84 MHz	25.00 kHz	0	0	0
S195	140.86 MHz	25.00 kHz	0	0	0
S196	140.89 MHz	25.00 kHz	0	0	0
S197	140.91 MHz	25.00 kHz	0	0	0
S198	140.94 MHz	25.00 kHz	0	0	0
S199	140.96 MHz	25.00 kHz	0	0	0
S200	140.99 MHz	25.00 kHz	0	0	0
S201	141.01 MHz	25.00 kHz	0	0	0
S202	141.04 MHz	25.00 kHz	0	0	0
S203	141.06 MHz	25.00 kHz	0	0	0
S204	141.09 MHz	25.00 kHz	0	0	0
S205	141.11 MHz	25.00 kHz	0	0	0
S206	141.14 MHz	25.00 kHz	0	0	0
S207	141.16 MHz	25.00 kHz	0	0	0
S208	141.19 MHz	25.00 kHz	0	0	0
S209	141.21 MHz	25.00 kHz	0	0	0
S210	141.24 MHz	25.00 kHz	0	0	0
S211	141.26 MHz	25.00 kHz	0	0	0
S212	141.29 MHz	25.00 kHz	0	0	0
S213	141.31 MHz	25.00 kHz	0	0	0
S214	141.34 MHz	25.00 kHz	0	0	0
S215	141.36 MHz	25.00 kHz	0	0	0
S216	141.39 MHz	25.00 kHz	0	0	0
S217	141.41 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S218	141.44 MHz	25.00 kHz	0	0	0
S219	141.46 MHz	25.00 kHz	0	0	0

S220	141.49 MHz	25.00 kHz	0	0	0
S221	141.51 MHz	25.00 kHz	0	0	0
S222	141.54 MHz	25.00 kHz	0	0	0
S223	141.56 MHz	25.00 kHz	0	0	0
S224	141.59 MHz	25.00 kHz	0	0	0
S225	141.61 MHz	25.00 kHz	0	0	0
S226	141.64 MHz	25.00 kHz	0	0	0
S227	141.66 MHz	25.00 kHz	0	0	0
S228	141.69 MHz	25.00 kHz	0	0	0
S229	141.71 MHz	25.00 kHz	0	0	0
S230	141.74 MHz	25.00 kHz	0	0	0
S231	141.76 MHz	25.00 kHz	0	0	0
S232	141.79 MHz	25.00 kHz	0	0	0
S233	141.81 MHz	25.00 kHz	0	0	0
S234	141.84 MHz	25.00 kHz	0	0	0
S235	141.86 MHz	25.00 kHz	0	0	0
S236	141.89 MHz	25.00 kHz	0	0	0
S237	141.91 MHz	25.00 kHz	0	0	0
S238	141.94 MHz	25.00 kHz	0	0	0
S239	141.96 MHz	25.00 kHz	0	0	0
S240	141.99 MHz	25.00 kHz	0	0	0

Annexures 6

The following are the details of the system generated spectrum occupancy report monitoring for VHF frequency range 142-150 MHz from the fixed monitoring equipment.

Monitoring Data Station

Name: FMU308w_100305

Latitude: 89.6243591308594 °

Longitude: 27.474723815918 °

Receiver: LS-RX-08-T

Type: FCO 5

Time Interval: 5 min

Channel Sets: VHF Monitoring

Measurement Receiver Settings

Name: VHF March 2024 (142-150)

Mode: Frequency Range

Freq. Range: 142.00 MHz - 150.00 MHz

RBW: 25.00 kHz

Step Width: 24.69 kHz

Start Time: 3/27/2024 4:55:00 AM

Stop Time: 3/27/2024 5:15:00 AM

Duration: 20 Minutes 0 Second

Attenuation: Auto

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S241	142.01 MHz	25.00 kHz	0	0	0

S242	142.04 MHz	25.00 kHz	0	0	0
S243	142.06 MHz	25.00 kHz	0	0	0
S244	142.09 MHz	25.00 kHz	0	0	0
S245	142.11 MHz	25.00 kHz	0	0	0
S246	142.14 MHz	25.00 kHz	0	0	0
S247	142.16 MHz	25.00 kHz	0	0	0
S248	142.19 MHz	25.00 kHz	0	0	0
S249	142.21 MHz	25.00 kHz	0	0	0
S250	142.24 MHz	25.00 kHz	0	0	0
S251	142.26 MHz	25.00 kHz	0	0	0
S252	142.29 MHz	25.00 kHz	0	0	0
S253	142.31 MHz	25.00 kHz	0	0	0
S254	142.34 MHz	25.00 kHz	0	0	0
S255	142.36 MHz	25.00 kHz	0	0	0
S256	142.39 MHz	25.00 kHz	0	0	0
S257	142.41 MHz	25.00 kHz	0	0	0
S258	142.44 MHz	25.00 kHz	0	0	0
S259	142.46 MHz	25.00 kHz	0	0	0
S260	142.49 MHz	25.00 kHz	0	0	0
S261	142.51 MHz	25.00 kHz	0	0	0
S262	142.54 MHz	25.00 kHz	0	0	0
S263	142.56 MHz	25.00 kHz	0	0	0
S264	142.59 MHz	25.00 kHz	0	0	0
S265	142.61 MHz	25.00 kHz	0	0	0
S266	142.64 MHz	25.00 kHz	0	0	0
S267	142.66 MHz	25.00 kHz	0	0	0
S268	142.69 MHz	25.00 kHz	0	0	0
S269	142.71 MHz	25.00 kHz	0	0	0
S270	142.74 MHz	25.00 kHz	0	0	0
S271	142.76 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S272	142.79 MHz	25.00 kHz	0	0	0
S273	142.81 MHz	25.00 kHz	0	0	0
S274	142.84 MHz	25.00 kHz	0	0	0
S275	142.86 MHz	25.00 kHz	0	0	0
S276	142.89 MHz	25.00 kHz	0	0	0
S277	142.91 MHz	25.00 kHz	0	0	0
S278	142.94 MHz	25.00 kHz	0	0	0
S279	142.96 MHz	25.00 kHz	0	0	0
S280	142.99 MHz	25.00 kHz	0	0	0
S281	143.01 MHz	25.00 kHz	0	0	0
S282	143.04 MHz	25.00 kHz	0	0	0
S283	143.06 MHz	25.00 kHz	0	0	0
S284	143.09 MHz	25.00 kHz	0	0	0
S285	143.11 MHz	25.00 kHz	0	0	0

S286	143.14 MHz	25.00 kHz	0	0	0
S287	143.16 MHz	25.00 kHz	0	0	0
S288	143.19 MHz	25.00 kHz	0	0	0
S289	143.21 MHz	25.00 kHz	0	0	0
S290	143.24 MHz	25.00 kHz	0	0	0
S291	143.26 MHz	25.00 kHz	0	0	0
S292	143.29 MHz	25.00 kHz	0	0	0
S293	143.31 MHz	25.00 kHz	0	0	0
S294	143.34 MHz	25.00 kHz	0	0	0
S295	143.36 MHz	25.00 kHz	0	0	0
S296	143.39 MHz	25.00 kHz	0	0	0
S297	143.41 MHz	25.00 kHz	0	0	0
S298	143.44 MHz	25.00 kHz	0	0	0
S299	143.46 MHz	25.00 kHz	0	0	0
S300	143.49 MHz	25.00 kHz	0	0	0
S301	143.51 MHz	25.00 kHz	0	0	0
S302	143.54 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S303	143.56 MHz	25.00 kHz	0	0	0
S304	143.59 MHz	25.00 kHz	0	0	0
S305	143.61 MHz	25.00 kHz	0	0	0
S306	143.64 MHz	25.00 kHz	0	0	0
S307	143.66 MHz	25.00 kHz	0	0	0
S308	143.69 MHz	25.00 kHz	0	0	0
S309	143.71 MHz	25.00 kHz	0	0	0
S310	143.74 MHz	25.00 kHz	0	0	0
S311	143.76 MHz	25.00 kHz	0	0	0
S312	143.79 MHz	25.00 kHz	0	0	0
S313	143.81 MHz	25.00 kHz	0	0	0
S314	143.84 MHz	25.00 kHz	0	0	0
S315	143.86 MHz	25.00 kHz	0	0	0
S316	143.89 MHz	25.00 kHz	0	0	0
S317	143.91 MHz	25.00 kHz	0	0	0
S318	143.94 MHz	25.00 kHz	0	0	0
S319	143.96 MHz	25.00 kHz	0	0	0
S320	143.99 MHz	25.00 kHz	0	0	0
S321	144.01 MHz	25.00 kHz	0	0	0
S322	144.04 MHz	25.00 kHz	0	0	0
S323	144.06 MHz	25.00 kHz	0	0	0
S324	144.09 MHz	25.00 kHz	0	0	0
S325	144.11 MHz	25.00 kHz	0	0	0
S326	144.14 MHz	25.00 kHz	0	0	0
S327	144.16 MHz	25.00 kHz	0	0	0
S328	144.19 MHz	25.00 kHz	0	0	0
S329	144.21 MHz	25.00 kHz	0	0	0
S330	144.24 MHz	25.00 kHz	0	0	0
S331	144.26 MHz	25.00 kHz	0	0	0

S332	144.29 MHz	25.00 kHz	0	0	0
S333	144.31 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S334	144.34 MHz	25.00 kHz	0	0	0
S335	144.36 MHz	25.00 kHz	0	0	0
S336	144.39 MHz	25.00 kHz	0	0	0
S337	144.41 MHz	25.00 kHz	0	0	0
S338	144.44 MHz	25.00 kHz	0	0	0
S339	144.46 MHz	25.00 kHz	0	0	0
S340	144.49 MHz	25.00 kHz	0	0	0
S341	144.51 MHz	25.00 kHz	0	0	0
S342	144.54 MHz	25.00 kHz	0	0	0
S343	144.56 MHz	25.00 kHz	0	0	0
S344	144.59 MHz	25.00 kHz	0	0	0
S345	144.61 MHz	25.00 kHz	0	0	0
S346	144.64 MHz	25.00 kHz	0	0	0
S347	144.66 MHz	25.00 kHz	0	0	0
S348	144.69 MHz	25.00 kHz	0	0	0
S349	144.71 MHz	25.00 kHz	0	0	0
S350	144.74 MHz	25.00 kHz	0	0	0
S351	144.76 MHz	25.00 kHz	0	0	0
S352	144.79 MHz	25.00 kHz	0	0	0
S353	144.81 MHz	25.00 kHz	0	0	0
S354	144.84 MHz	25.00 kHz	0	0	0
S355	144.86 MHz	25.00 kHz	0	0	0
S356	144.89 MHz	25.00 kHz	0	0	0
S357	144.91 MHz	25.00 kHz	0	0	0
S358	144.94 MHz	25.00 kHz	0	0	0
S359	144.96 MHz	25.00 kHz	0	0	0
S360	144.99 MHz	25.00 kHz	0	0	0
S361	145.01 MHz	25.00 kHz	0	0	0
S362	145.04 MHz	25.00 kHz	0	0	0
S363	145.06 MHz	25.00 kHz	0	0	0
S364	145.09 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Ma	Avg	Min
S365	145.11 MHz	25.00 kHz	0	0	0
S366	145.14 MHz	25.00 kHz	0	0	0
S367	145.16 MHz	25.00 kHz	0	0	0
S368	145.19 MHz	25.00 kHz	0	0	0
S369	145.21 MHz	25.00 kHz	0	0	0

S370	145.24 MHz	25.00 kHz	0	0	0
S371	145.26 MHz	25.00 kHz	0	0	0
S372	145.29 MHz	25.00 kHz	0	0	0
S373	145.31 MHz	25.00 kHz	0	0	0
S374	145.34 MHz	25.00 kHz	0	0	0
S375	145.36 MHz	25.00 kHz	0	0	0
S376	145.39 MHz	25.00 kHz	0	0	0
S377	145.41 MHz	25.00 kHz	0	0	0
S378	145.44 MHz	25.00 kHz	0	0	0
S379	145.46 MHz	25.00 kHz	0	0	0
S380	145.49 MHz	25.00 kHz	0	0	0
S381	145.51 MHz	25.00 kHz	0	0	0
S382	145.54 MHz	25.00 kHz	0	0	0
S383	145.56 MHz	25.00 kHz	0	0	0
S384	145.59 MHz	25.00 kHz	0	0	0
S385	145.61 MHz	25.00 kHz	0	0	0
S386	145.64 MHz	25.00 kHz	0	0	0
S387	145.66 MHz	25.00 kHz	0	0	0
S388	145.69 MHz	25.00 kHz	0	0	0
S389	145.71 MHz	25.00 kHz	0	0	0
S390	145.74 MHz	25.00 kHz	0	0	0
S391	145.76 MHz	25.00 kHz	0	0	0
S392	145.79 MHz	25.00 kHz	0	0	0
S393	145.81 MHz	25.00 kHz	0	0	0
S394	145.84 MHz	25.00 kHz	0	0	0
S395	145.86 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Ma	Avg	Min
S396	145.89 MHz	25.00 kHz	0	0	0
S397	145.91 MHz	25.00 kHz	0	0	0
S398	145.94 MHz	25.00 kHz	0	0	0
S399	145.96 MHz	25.00 kHz	0	0	0
S400	145.99 MHz	25.00 kHz	0	0	0
S401	146.01 MHz	25.00 kHz	0	0	0
S402	146.04 MHz	25.00 kHz	0	0	0
S403	146.06 MHz	25.00 kHz	0	0	0
S404	146.09 MHz	25.00 kHz	0	0	0
S405	146.11 MHz	25.00 kHz	0	0	0
S406	146.14 MHz	25.00 kHz	0	0	0
S407	146.16 MHz	25.00 kHz	0	0	0
S408	146.19 MHz	25.00 kHz	0	0	0
S409	146.21 MHz	25.00 kHz	0	0	0
S410	146.24 MHz	25.00 kHz	0	0	0
S411	146.26 MHz	25.00 kHz	0	0	0
S412	146.29 MHz	25.00 kHz	0	0	0
S413	146.31 MHz	25.00 kHz	0	0	0

S414	146.34 MHz	25.00 kHz	0	0	0
S415	146.36 MHz	25.00 kHz	0	0	0
S416	146.39 MHz	25.00 kHz	0	0	0
S417	146.41 MHz	25.00 kHz	0	0	0
S418	146.44 MHz	25.00 kHz	0	0	0
S419	146.46 MHz	25.00 kHz	0	0	0
S420	146.49 MHz	25.00 kHz	0	0	0
S421	146.51 MHz	25.00 kHz	0	0	0
S422	146.54 MHz	25.00 kHz	0	0	0
S423	146.56 MHz	25.00 kHz	0	0	0
S424	146.59 MHz	25.00 kHz	0	0	0
S425	146.61 MHz	25.00 kHz	0	0	0
S426	146.64 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S427	146.66 MHz	25.00 kHz	0	0	0
S428	146.69 MHz	25.00 kHz	0	0	0
S429	146.71 MHz	25.00 kHz	0	0	0
S430	146.74 MHz	25.00 kHz	0	0	0
S431	146.76 MHz	25.00 kHz	0	0	0
S432	146.79 MHz	25.00 kHz	0	0	0
S433	146.81 MHz	25.00 kHz	0	0	0
S434	146.84 MHz	25.00 kHz	0	0	0
S435	146.86 MHz	25.00 kHz	0	0	0
S436	146.89 MHz	25.00 kHz	0	0	0
S437	146.91 MHz	25.00 kHz	0	0	0
S438	146.94 MHz	25.00 kHz	0	0	0
S439	146.96 MHz	25.00 kHz	0	0	0
S440	146.99 MHz	25.00 kHz	0	0	0
S441	147.01 MHz	25.00 kHz	0	0	0
S442	147.04 MHz	25.00 kHz	0	0	0
S443	147.06 MHz	25.00 kHz	0	0	0
S444	147.09 MHz	25.00 kHz	0	0	0
S445	147.11 MHz	25.00 kHz	0	0	0
S446	147.14 MHz	25.00 kHz	0	0	0
S447	147.16 MHz	25.00 kHz	0	0	0
S448	147.19 MHz	25.00 kHz	0	0	0
S449	147.21 MHz	25.00 kHz	0	0	0
S450	147.24 MHz	25.00 kHz	0	0	0
S451	147.26 MHz	25.00 kHz	0	0	0
S452	147.29 MHz	25.00 kHz	0	0	0
S453	147.31 MHz	25.00 kHz	0	0	0
S454	147.34 MHz	25.00 kHz	0	0	0
S455	147.36 MHz	25.00 kHz	0	0	0
S456	147.39 MHz	25.00 kHz	0	0	0
S457	147.41 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Ma	Avg	Min
			x		
S458	147.44 MHz	25.00 kHz	0	0	0
S459	147.46 MHz	25.00 kHz	0	0	0
S460	147.49 MHz	25.00 kHz	0	0	0
S461	147.51 MHz	25.00 kHz	0	0	0
S462	147.54 MHz	25.00 kHz	0	0	0
S463	147.56 MHz	25.00 kHz	0	0	0
S464	147.59 MHz	25.00 kHz	0	0	0
S465	147.61 MHz	25.00 kHz	0	0	0
S466	147.64 MHz	25.00 kHz	0	0	0
S467	147.66 MHz	25.00 kHz	0	0	0
S468	147.69 MHz	25.00 kHz	0	0	0
S469	147.71 MHz	25.00 kHz	0	0	0
S470	147.74 MHz	25.00 kHz	0	0	0
S471	147.76 MHz	25.00 kHz	0	0	0
S472	147.79 MHz	25.00 kHz	0	0	0
S473	147.81 MHz	25.00 kHz	0	0	0
S474	147.84 MHz	25.00 kHz	0	0	0
S475	147.86 MHz	25.00 kHz	0	0	0
S476	147.89 MHz	25.00 kHz	0	0	0
S477	147.91 MHz	25.00 kHz	0	0	0
S478	147.94 MHz	25.00 kHz	0	0	0
S479	147.96 MHz	25.00 kHz	0	0	0
S480	147.99 MHz	25.00 kHz	0	0	0
S481	148.01 MHz	25.00 kHz	0	0	0
S482	148.04 MHz	25.00 kHz	0	0	0
S483	148.06 MHz	25.00 kHz	0	0	0
S484	148.09 MHz	25.00 kHz	0	0	0
S485	148.11 MHz	25.00 kHz	0	0	0
S486	148.14 MHz	25.00 kHz	0	0	0
S487	148.16 MHz	25.00 kHz	0	0	0
S488	148.19 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Ma	Avg	Min
			x		
S489	148.21 MHz	25.00 kHz	0	0	0
S490	148.24 MHz	25.00 kHz	0	0	0
S491	148.26 MHz	25.00 kHz	0	0	0
S492	148.29 MHz	25.00 kHz	0	0	0
S493	148.31 MHz	25.00 kHz	0	0	0

S494	148.34 MHz	25.00 kHz	0	0	0
S495	148.36 MHz	25.00 kHz	0	0	0
S496	148.39 MHz	25.00 kHz	0	0	0
S497	148.41 MHz	25.00 kHz	0	0	0
S498	148.44 MHz	25.00 kHz	0	0	0
S499	148.46 MHz	25.00 kHz	0	0	0
S500	148.49 MHz	25.00 kHz	0	0	0
S501	148.51 MHz	25.00 kHz	0	0	0
S502	148.54 MHz	25.00 kHz	0	0	0
S503	148.56 MHz	25.00 kHz	0	0	0
S504	148.59 MHz	25.00 kHz	0	0	0
S505	148.61 MHz	25.00 kHz	0	0	0
S506	148.64 MHz	25.00 kHz	0	0	0
S507	148.66 MHz	25.00 kHz	0	0	0
S508	148.69 MHz	25.00 kHz	0	0	0
S509	148.71 MHz	25.00 kHz	0	0	0
S510	148.74 MHz	25.00 kHz	0	0	0
S511	148.76 MHz	25.00 kHz	0	0	0
S512	148.79 MHz	25.00 kHz	0	0	0
S513	148.81 MHz	25.00 kHz	0	0	0
S514	148.84 MHz	25.00 kHz	0	0	0
S515	148.86 MHz	25.00 kHz	0	0	0
S516	148.89 MHz	25.00 kHz	0	0	0
S517	148.91 MHz	25.00 kHz	0	0	0
S518	148.94 MHz	25.00 kHz	0	0	0
S519	148.96 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Ma	Avg	Min
S520	148.99 MHz	25.00 kHz	0	0	0
S521	149.01 MHz	25.00 kHz	0	0	0
S522	149.04 MHz	25.00 kHz	0	0	0
S523	149.06 MHz	25.00 kHz	0	0	0
S524	149.09 MHz	25.00 kHz	0	0	0
S525	149.11 MHz	25.00 kHz	0	0	0
S526	149.14 MHz	25.00 kHz	0	0	0
S527	149.16 MHz	25.00 kHz	0	0	0
S528	149.19 MHz	25.00 kHz	0	0	0
S529	149.21 MHz	25.00 kHz	0	0	0
S530	149.24 MHz	25.00 kHz	0	0	0
S531	149.26 MHz	25.00 kHz	0	0	0
S532	149.29 MHz	25.00 kHz	0	0	0
S533	149.31 MHz	25.00 kHz	0	0	0
S534	149.34 MHz	25.00 kHz	0	0	0
S535	149.36 MHz	25.00 kHz	0	0	0
S536	149.39 MHz	25.00 kHz	0	0	0
S537	149.41 MHz	25.00 kHz	0	0	0

S538	149.44 MHz	25.00 kHz	0	0	0
S539	149.46 MHz	25.00 kHz	0	0	0
S540	149.49 MHz	25.00 kHz	0	0	0
S541	149.51 MHz	25.00 kHz	0	0	0
S542	149.54 MHz	25.00 kHz	0	0	0
S543	149.56 MHz	25.00 kHz	0	0	0
S544	149.59 MHz	25.00 kHz	0	0	0
S545	149.61 MHz	25.00 kHz	0	0	0
S546	149.64 MHz	25.00 kHz	0	0	0
S547	149.66 MHz	25.00 kHz	0	0	0
S548	149.69 MHz	25.00 kHz	0	0	0
S549	149.71 MHz	25.00 kHz	0	0	0
S550	149.74 MHz	25.00 kHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S551	149.76 MHz	25.00 kHz	0	0	0
S552	149.79 MHz	25.00 kHz	0	0	0
S553	149.81 MHz	25.00 kHz	0	0	0
S554	149.84 MHz	25.00 kHz	0	0	0
S555	149.86 MHz	25.00 kHz	0	0	0
S556	149.89 MHz	25.00 kHz	0	0	0
S557	149.91 MHz	25.00 kHz	0	0	0
S558	149.94 MHz	25.00 kHz	0	0	0
S559	149.96 MHz	25.00 kHz	0	0	0
S560	149.99 MHz	25.00 kHz	0	0	0

Annexures 7

The following are the details of the system generated spectrum occupancy report monitoring for 2G transmitter GSM 900 band from the fixed monitoring equipment.

Monitoring Station

Data

Name: FMU308w_100305
Latitude: 89.6242218017578 °
Longitude: 27.4747543334961 °
Receiver: LS-RX-08-T
Type: FCO 5
Time Interval: 5 min
Channel Sets: GSM 900 MHz

Measurement

Receiver Settings

Name: 900 GSM
Mode: Frequency Range
Freq. Range: 900.00 MHz - 956.00 MHz
RBW: 300.00 kHz
Step Width: 278.61 kHz
Start Time: 3/27/2024 5:50:00 AM
Stop Time: 3/27/2024 6:15:00 AM
Duration: 25 Minutes 0 Second
Attenuation: 30 dB

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S1	900.50 MHz	1.00 MHz	0	0	0
S2	901.50 MHz	1.00 MHz	0	0	0
S3	902.50 MHz	1.00 MHz	0	0	0
S4	903.50 MHz	1.00 MHz	0	0	0
S5	904.50 MHz	1.00 MHz	0	0	0
S6	905.50 MHz	1.00 MHz	0	0	0
S7	906.50 MHz	1.00 MHz	0	0	0
S8	907.50 MHz	1.00 MHz	0	0	0
S9	908.50 MHz	1.00 MHz	0	0	0
S10	909.50 MHz	1.00 MHz	0	0	0
S11	910.50 MHz	1.00 MHz	0	0	0
S12	911.50 MHz	1.00 MHz	0	0	0
S13	912.50 MHz	1.00 MHz	0	0	0
S14	913.50 MHz	1.00 MHz	0	0	0
S15	914.50 MHz	1.00 MHz	0	0	0
S16	915.50 MHz	1.00 MHz	0	0	0
S17	916.50 MHz	1.00 MHz	0	0	0
S18	917.50 MHz	1.00 MHz	0	0	0
S19	918.50 MHz	1.00 MHz	0	0	0
S20	919.50 MHz	1.00 MHz	0	0	0
S21	920.50 MHz	1.00 MHz	0	0	0
S22	921.50 MHz	1.00 MHz	0	0	0
S23	922.50 MHz	1.00 MHz	0	0	0
S24	923.50 MHz	1.00 MHz	0	0	0
S25	924.50 MHz	1.00 MHz	0	0	0
S26	925.50 MHz	1.00 MHz	0	0	0
S27	926.50 MHz	1.00 MHz	0	0	0
S28	927.50 MHz	1.00 MHz	0	0	0
S29	928.50 MHz	1.00 MHz	0	0	0
S30	929.50 MHz	1.00 MHz	0	0	0
S31	930.50 MHz	1.00 MHz	0	0	0

Channel Name	Main Frequency	Bandwidth	Occupancy [%]		
			Max	Avg	Min
S32	931.50 MHz	1.00 MHz	0	0	0
S33	932.50 MHz	1.00 MHz	0	0	0
S34	933.50 MHz	1.00 MHz	0	0	0
S35	934.50 MHz	1.00 MHz	0	0	0
S36	935.50 MHz	1.00 MHz	95	92	91
S37	936.50 MHz	1.00 MHz	97	96	96
S38	937.50 MHz	1.00 MHz	97	97	96
S39	938.50 MHz	1.00 MHz	0	0	0
S40	939.50 MHz	1.00 MHz	0	0	0

S41	940.50 MHz	1.00 MHz	0	0	0
S42	941.50 MHz	1.00 MHz	1	0	0
S43	942.50 MHz	1.00 MHz	1	0	0
S44	943.50 MHz	1.00 MHz	0	0	0
S45	944.50 MHz	1.00 MHz	0	0	0
S46	945.50 MHz	1.00 MHz	4	3	1
S47	946.50 MHz	1.00 MHz	14	8	4
S48	947.50 MHz	1.00 MHz	84	75	66
S49	948.50 MHz	1.00 MHz	58	43	30
S50	949.50 MHz	1.00 MHz	0	0	0
S51	950.50 MHz	1.00 MHz	0	0	0
S52	951.50 MHz	1.00 MHz	0	0	0
S53	952.50 MHz	1.00 MHz	0	0	0
S54	953.50 MHz	1.00 MHz	0	0	0
S55	954.50 MHz	1.00 MHz	0	0	0
S56	955.50 MHz	1.00 MHz	0	0	0