UNIVERSITI SAINS MALAYSIA

SCHOOL OF
PHARMACEUTICAL SCIENCES
PUSAT PENGAJIAN SAINS FARMASI

TEST REPORT

Client : Far East Pyramid Sdn. Bhd.

No. 11, Jalan Ekoperniagaan 1/20, Taman Ekoperniagaan, 81100 Johor Bahru, Johor, Malaysia

Product : Electromagnetic Noise Radiation Harmonizer

Brand Name : emGuarde

Date : :10th July 2024

Test title : The effective range of RF white noise suppression of Electromagnetic Noise Radiation Harmonizer

Objectives : :To evaluate the functional range of the Electromagnetic Noise Radiation Harmonizer across six distinct distances (1 meter, 2 meters, 3 meters, 4 meters, 5 meters and 6 meters all in radius) in diverse environmental conditions exposed to various sources of electromagnetic radiation, including but not limited to TV, lighting, computers, and other electronic devices. To evaluate the suppression of RF white noise at one of the between (35 MHz to 37 MHz, 71MHz to 73 MHz, and 107 MHz to 109 MHz).

Test setup :

1. Locations :4 Residential spaces, 2 working offices and 4 laboratories.
2. Distances :Six specific distances were chosen for testing –1 meter (1M), 2 meters (2M), 3 meters (3M), 4 meters radius (4M), 5 meters radius (5M) and 6 meters radius (6M).

Test procedure :

1. The initial electromagnetic wave noise spectra of the test locations were observed using Realtek Software Defined Radio (RTL-SDR) (RTL2832U chipset).
2. The electromagnetic wave noise spectrum recorded when the Electromagnetic Noise Radiation Harmonizer was off.
3. The Electromagnetic Noise Radiation Harmonizer was activated and moved to designated distance/locations.
4. The specific electromagnetic wave spectrum at (35 MHz to 37 MHz, 71MHz to 73 MHz, and 107 MHz to 109 MHz) were checked and recorded at each specific distance.
5. The percentage of suppression and fold of power decrease were calculated with formula:

Power level : $10^{\frac{dB}{10}}$

Percentage of suppression: $\frac{Initial\ power\ level - Final\ power\ level}{Initial\ power\ ratio} \times 100\%$

Fold decrease : $10^{\frac{initial\ dB - final\ dB}{10}}$

Certified True Copy
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Results:

1. The Electromagnetic Noise Radiation Harmonizer emGuarde successfully performed as required at distances of 1M, 2M, 3M, 4M, 5M and 6M all in radius under the various environment. It is proved that the device can effectively guarantee a coverage area of 6M radius.

2. The Electromagnetic Noise Radiation Harmonizer, emGuarde, effectively suppresses unwanted electromagnetic noise waves between 35 MHz to 37 MHz, 71MHz to 73 MHz, and 107 MHz to 109 MHz.

Table 1: Suppression of electromagnetic noise wave between 35 MHz to 37 MHz by emGuarde at 6 different distance ranges.

Environment	Average signal strength (dB)							Percentage of suppression (%)						Fold decrease					
	emGuarde OFF	emGuarde ON																	
		1M	2M	3M	4M	5M	6M	1M	2M	3M	4M	5M	6M	1M	2M	3M	4M	5M	6M
Residential Space																			
RS1	-25	-47	-44	-46	-46	-47	-47	99.4	98.7	99.2	99.2	99.4	99.4	158.5	79.4	125.9	125.9	158.5	158.5
RS2	-22	-49	-48	-49	-50	-48	-46	99.8	99.7	99.8	99.8	99.7	99.6	501.2	398.1	501.2	631.0	398.1	251.2
RS3	-26	-43	-45	-44	-42	-43	-42	98.0	98.7	98.4	97.5	98.0	97.5	50.1	79.4	63.1	39.8	50.1	39.8
RS4	-20	-46	-48	-42	-40	-41	-43	99.7	99.8	99.4	99.0	99.2	99.5	398.1	631.0	158.5	100.0	125.9	199.5
Working office																			
WO1	-33	-50	-50	-50	-49	-47	-47	98.0	98.0	98.0	97.5	96.0	96.0	50.1	50.1	50.1	39.8	25.1	25.1
WO2	-20	-40	-44	-42	-45	-43	-44	99.0	99.6	99.4	99.7	99.5	99.6	100.0	251.2	158.5	316.2	199.5	251.2
Laboratory																			
L1	-20	-44	-44	-38	-41	-40	-40	99.6	99.6	98.4	99.2	99.0	99.0	251.2	251.2	63.1	125.9	100.0	100.0
L2	-20	-40	-42	-40	-41	-40	-41	99.0	99.4	99.0	99.2	99.0	99.2	100.0	158.5	100.0	125.9	100.0	125.9
L3	-26	-48	-41	-40	-42	-40	-43	99.4	96.8	96.0	97.5	96.0	98.0	158.5	31.6	25.1	39.8	25.1	50.1
L4	-27	-48	-45	-46	-46	-45	-45	99.21	98.42	98.74	98.74	98.42	98.42	125.89	63.10	79.43	79.43	63.10	63.10

Table 2: Chart of percentage of suppression electromagnetic noise wave between 35 MHz to 37 MHz

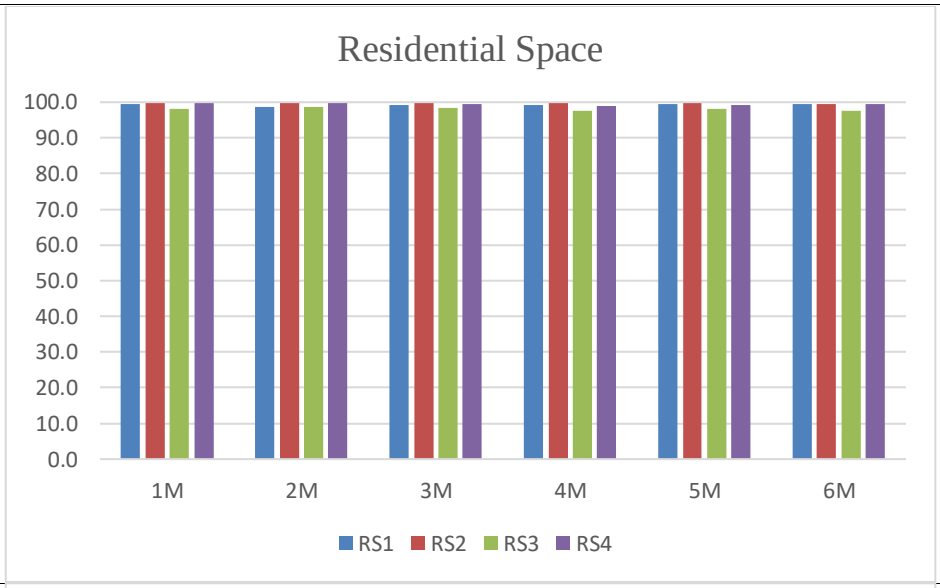
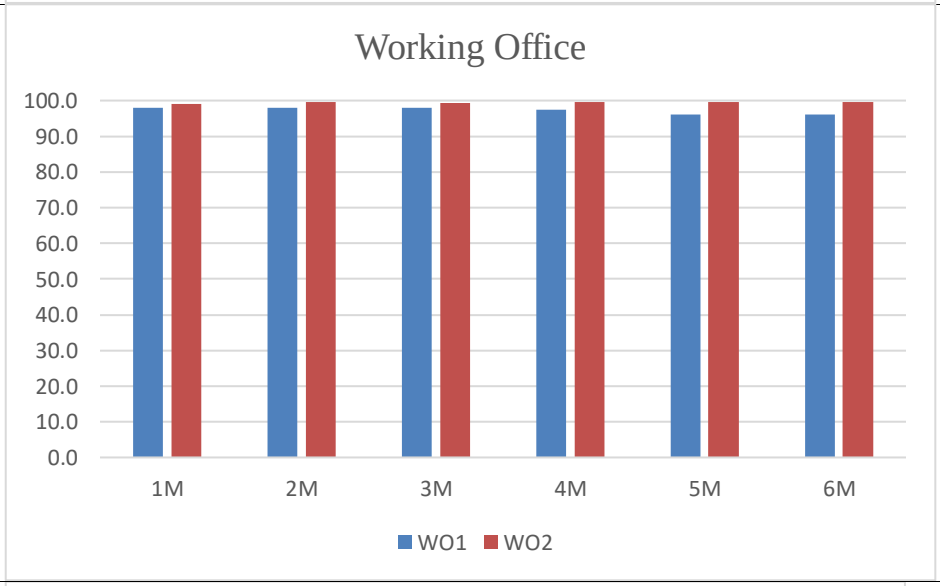
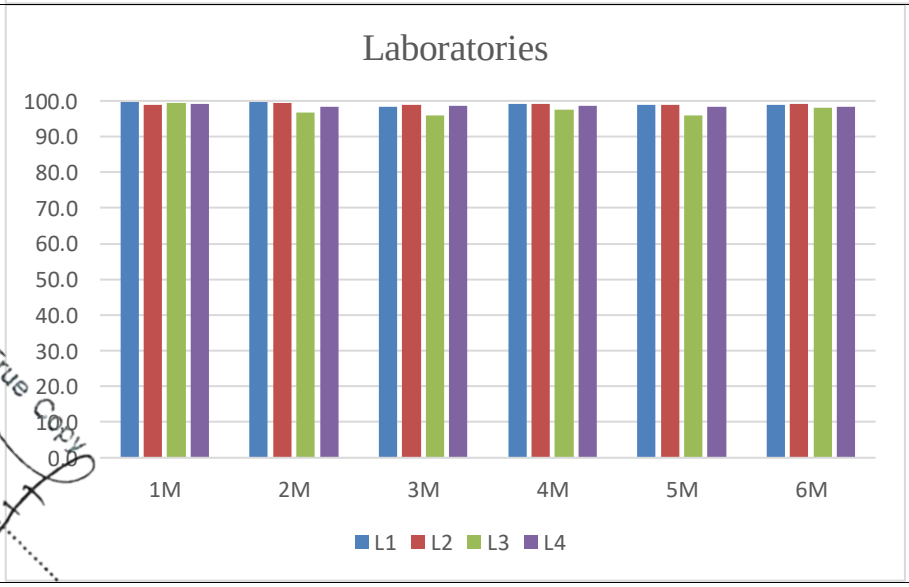
Test environments	Percentage of suppression
Residential Space	
Working office	
Laboratories	

Table 3: Electromagnetic noise wave between 35 MHz to 37 MHz for residential space

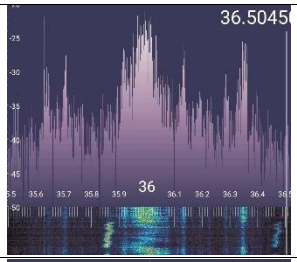
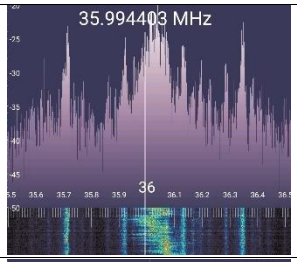
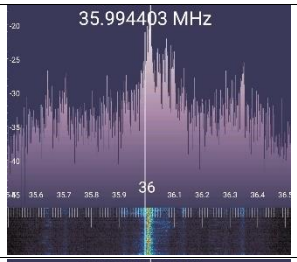
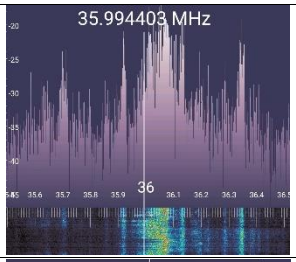
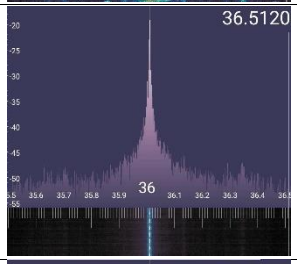
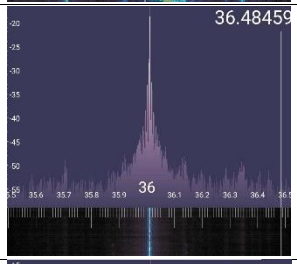
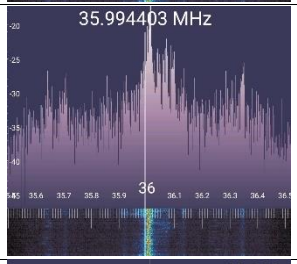
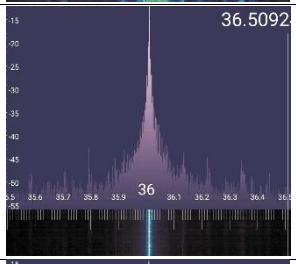
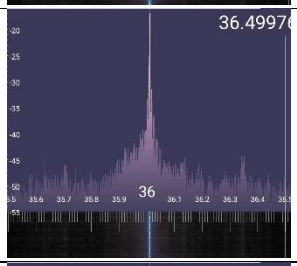
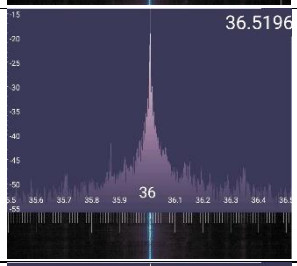
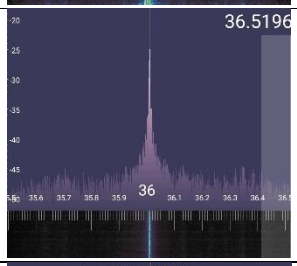
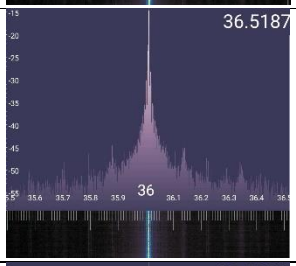
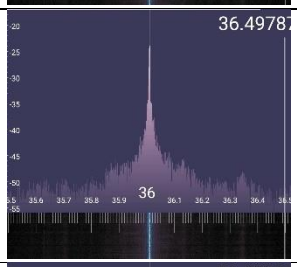
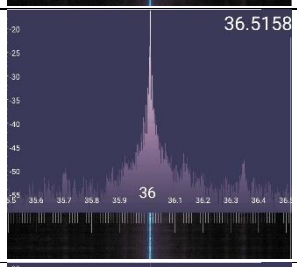
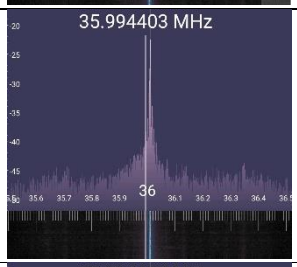
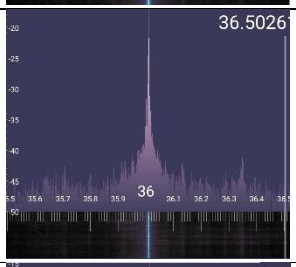
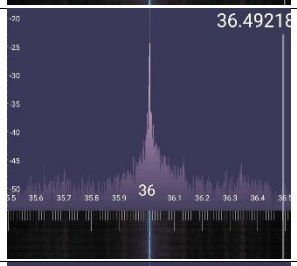
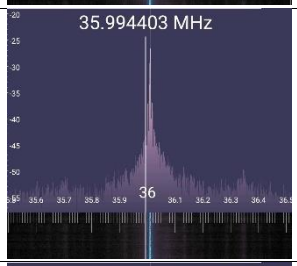
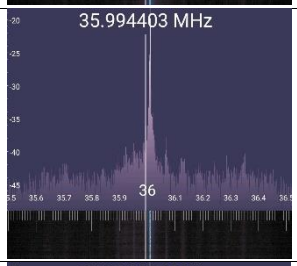
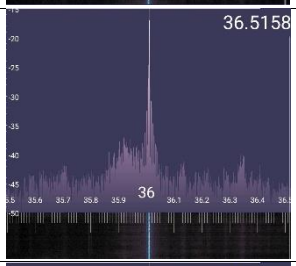
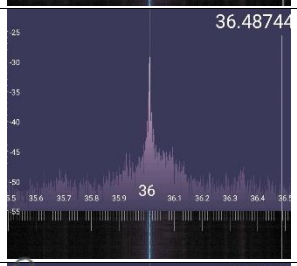
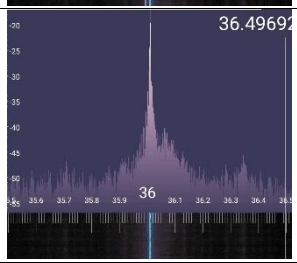
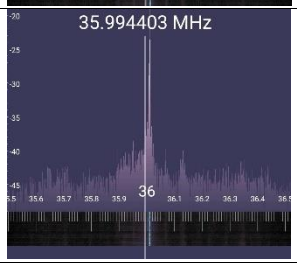
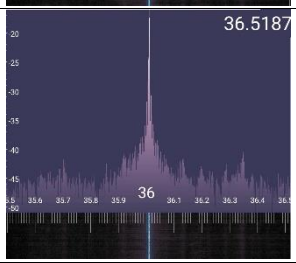
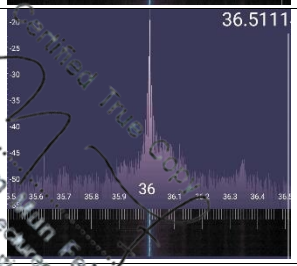
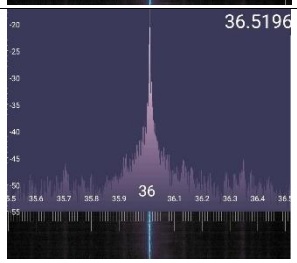
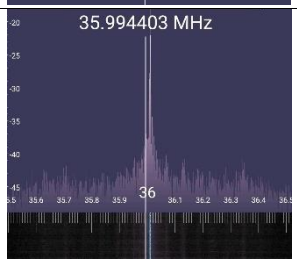
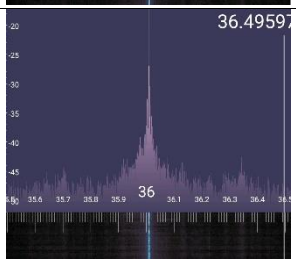
	RS 1	RS 2	RS 3	RS 4
emGuarde off				
1M				
2M				
3M				
4M				
5M				
6M				

Table 4: Electromagnetic noise wave between 35 MHz to 37 MHz for working office

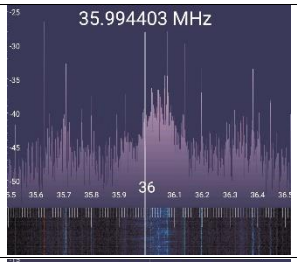
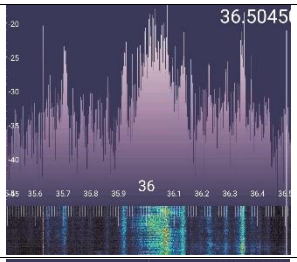
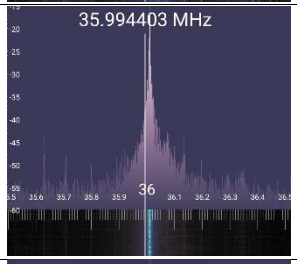
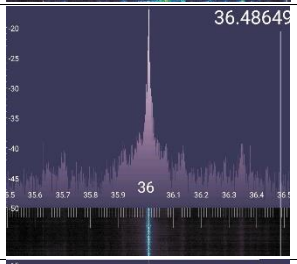
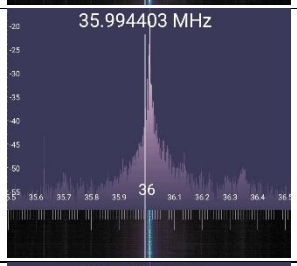
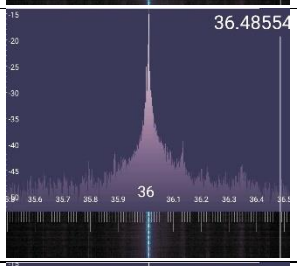
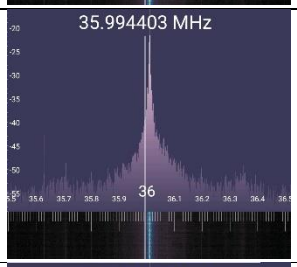
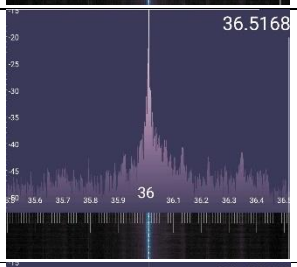
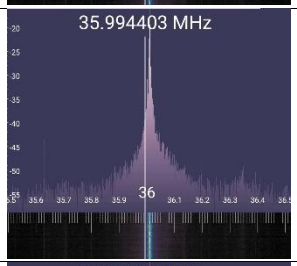
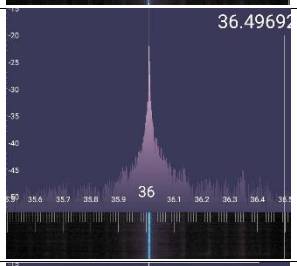
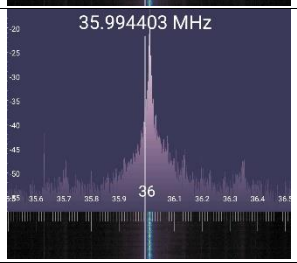
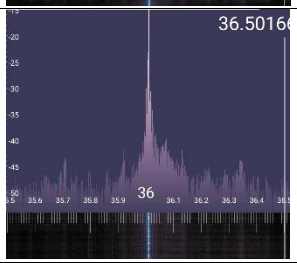
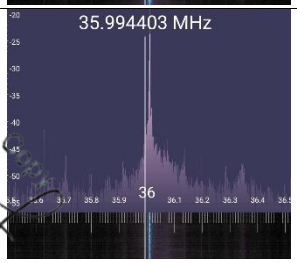
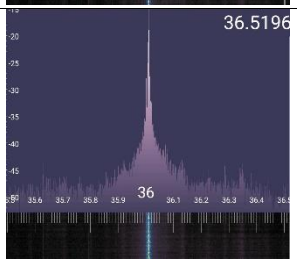
	WO 1	WO 2
emGuarde off		
1M		
2M		
3M		
4M		
5M		
6M		

Table 5: Electromagnetic noise wave between 35 MHz to 37 MHz for laboratories

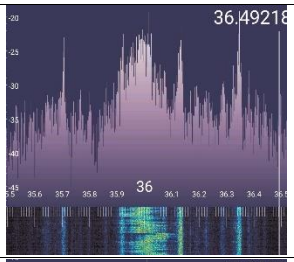
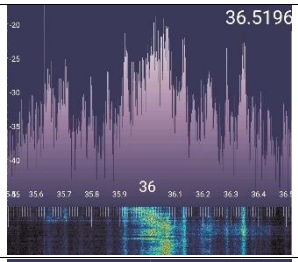
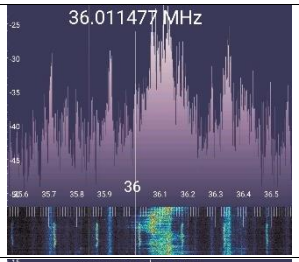
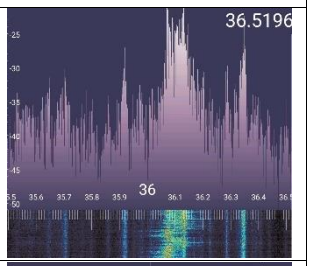
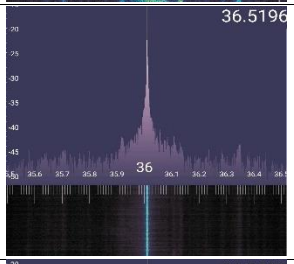
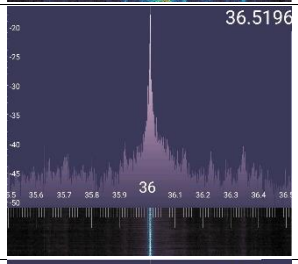
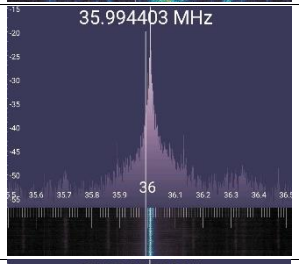
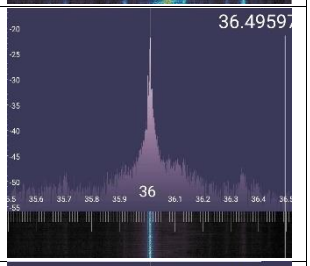
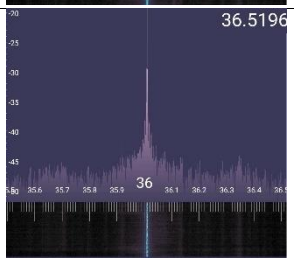
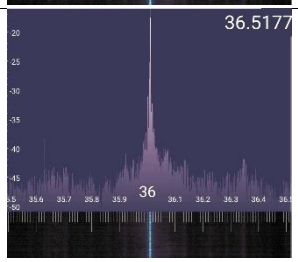
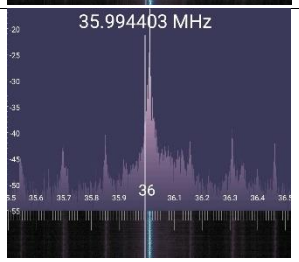
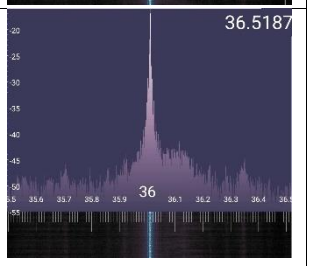
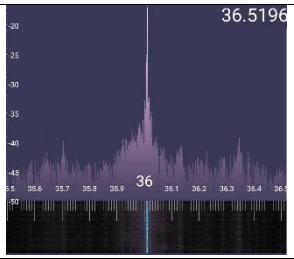
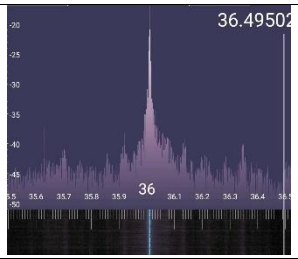
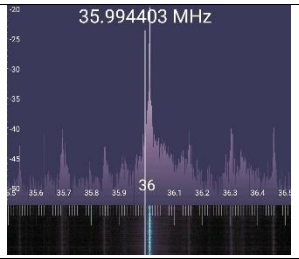
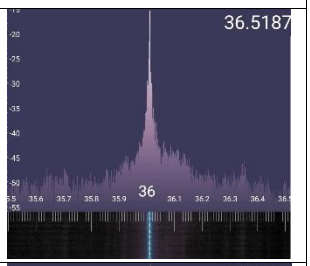
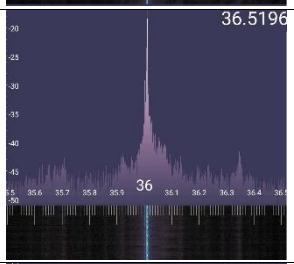
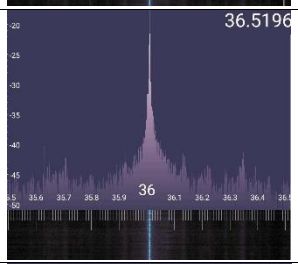
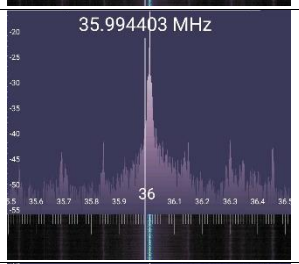
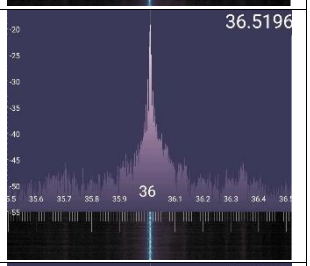
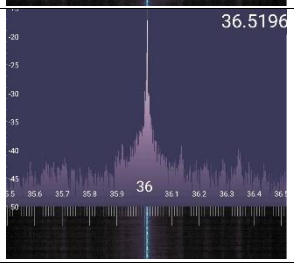
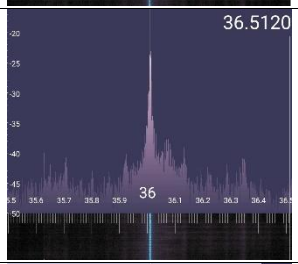
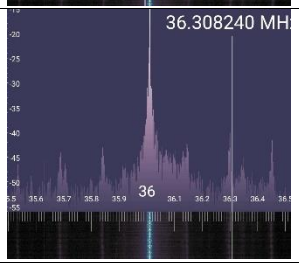
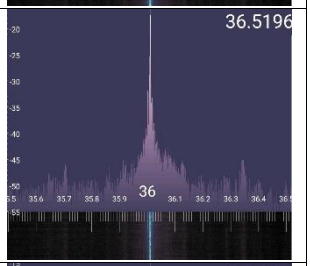
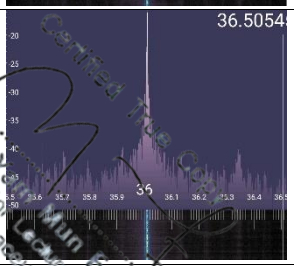
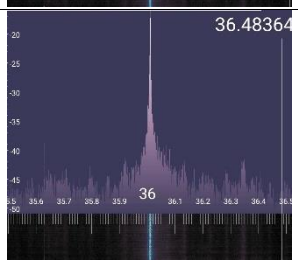
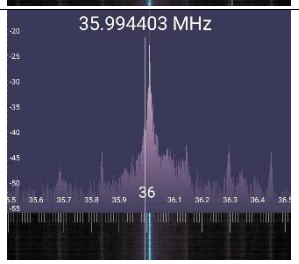
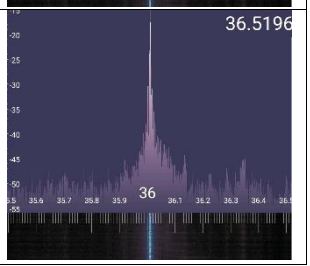
	L 1	L 2	L 3	L 4
emGuarde off				
1M				
2M				
3M				
4M				
5M				
6M				

Table 6: Suppression of electromagnetic noise wave between 71MHz to 73 MHz by emGuarde at 6 different distance ranges.

Environment	Average signal strength (dB)							Percentage of suppression (%)						Fold decrease					
	emGuarde OFF	emGuarde ON																	
		1M	2M	3M	4M	5M	6M	1M	2M	3M	4M	5M	6M	1M	2M	3M	4M	5M	6M
Residential Space																			
RS1	-23	-50	-52	-50	-49	-46	-47	99.8	99.9	99.8	99.7	99.5	99.6	501.2	794.3	501.2	398.1	199.5	251.2
RS2	-27	-54	-55	-50	-53	-50	-50	99.8	99.8	99.5	99.7	99.5	99.5	501.2	631.0	199.5	398.1	199.5	199.5
RS3	-25	-43	-46	-44	-44	-44	-42	98.4	99.2	98.7	98.7	98.7	98.0	63.1	125.9	79.4	79.4	79.4	50.1
RS4	-30	-45	-46	-42	-48	-50	-48	96.8	97.5	93.7	98.4	99.0	98.4	31.6	39.8	15.8	63.1	100.0	63.1
Working office																			
WO1	-30	-45	-40	-38	-35	-33	-33	96.8	90.0	84.2	68.4	49.9	49.9	31.6	10.0	6.3	3.2	2.0	2.0
WO2	-36	-44	-41	-40	-39	-38	-39	84.2	68.4	60.2	49.9	36.9	49.9	6.3	3.2	2.5	2.0	1.6	2.0
Laboratory																			
L1	-30	-37	-47	-48	-47	-47	-47	80.0	98.0	98.4	98.0	98.0	98.0	5.0	50.1	63.1	50.1	50.1	50.1
L2	-28	-44	-40	-46	-45	-46	-45	97.5	93.7	98.4	98.0	98.4	98.0	39.8	15.8	63.1	50.1	63.1	50.1
L3	-25	-33	-35	-34	-36	-36	-35	84.2	90.0	87.4	92.1	92.1	90.0	6.3	10.0	7.9	12.6	12.6	10.0
L4	-32	-38	-39	-40	-40	-38	-40	74.9	80.0	84.2	84.2	74.9	84.2	4.0	5.0	6.3	6.3	4.0	6.3

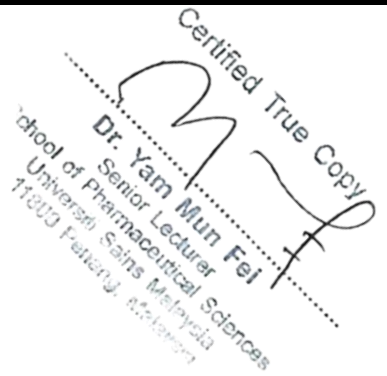


Table 7: Chart of percentage of suppression electromagnetic noise wave between 71 MHz to 73 MHz

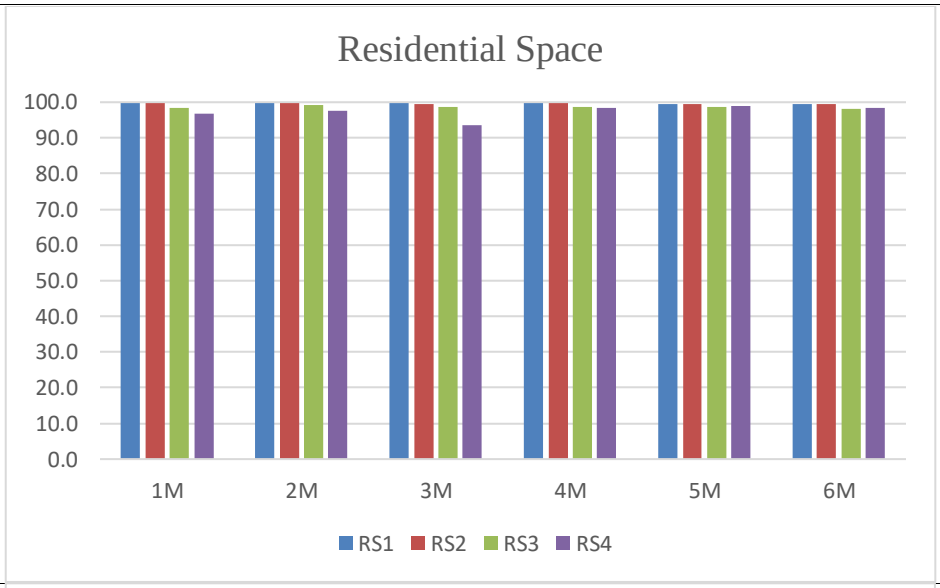
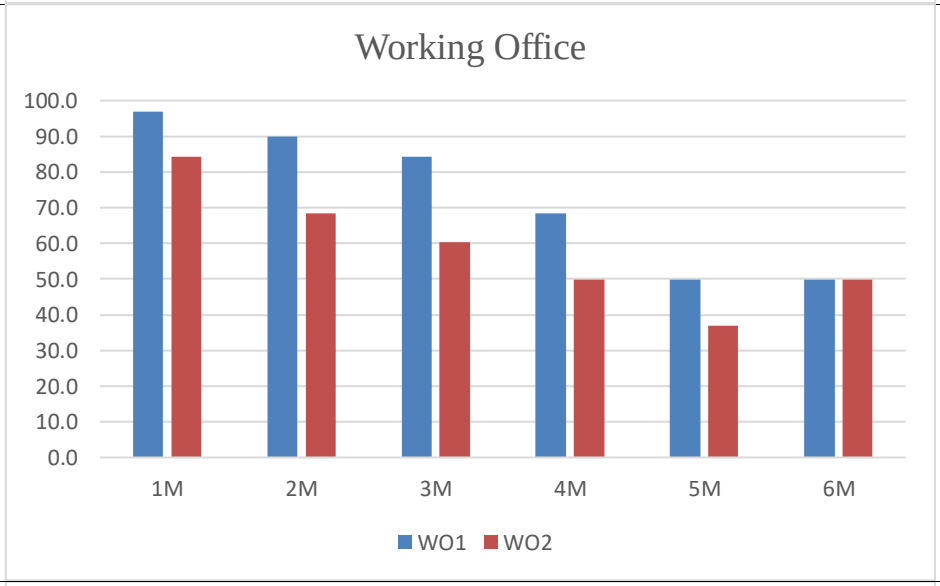
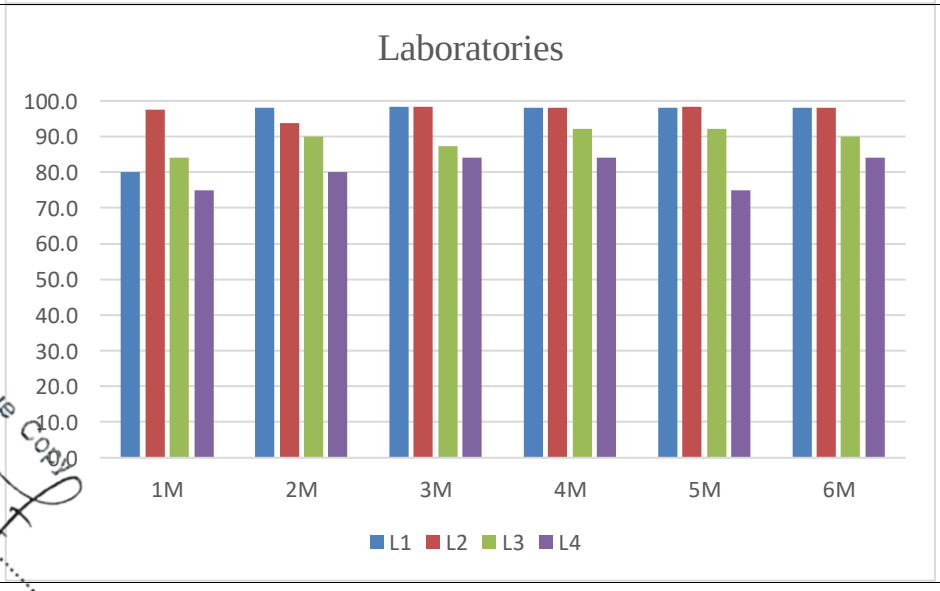
Test environments	Percentage of suppression
Residential Space	
Working office	
Laboratories	

Table 8: Electromagnetic noise wave between 71 MHz to 73 MHz for residential space

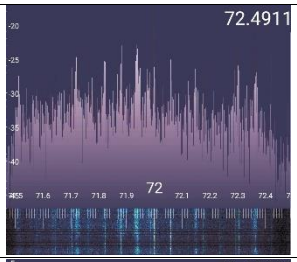
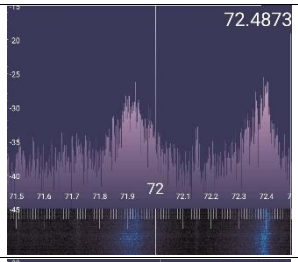
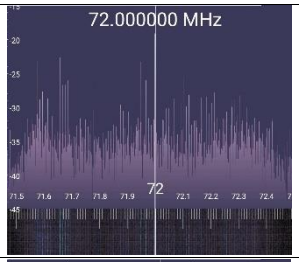
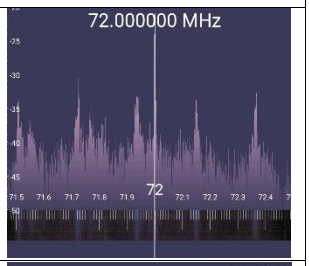
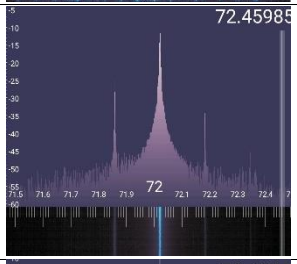
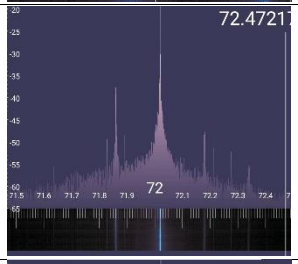
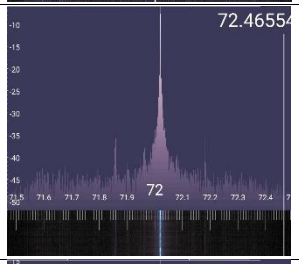
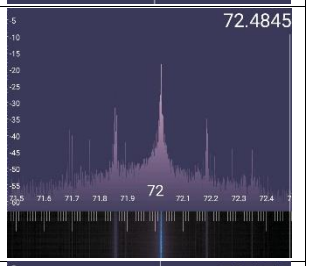
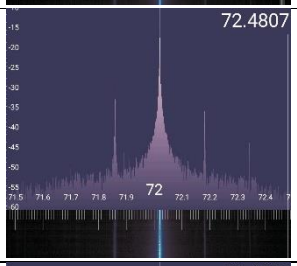
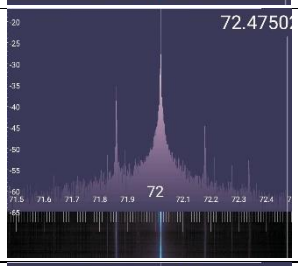
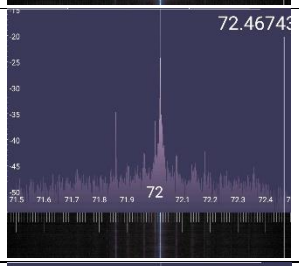
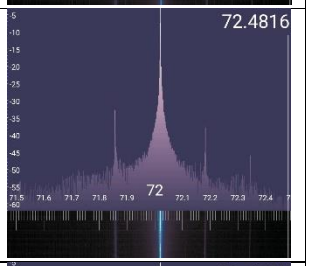
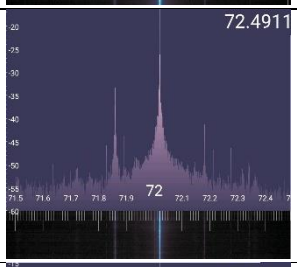
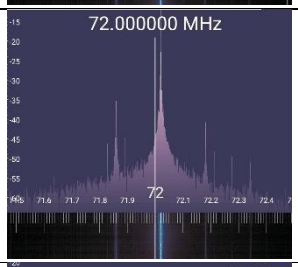
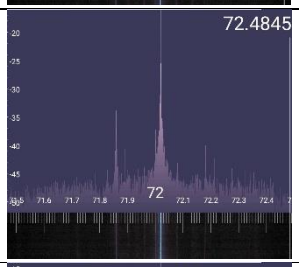
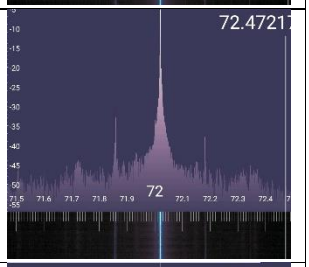
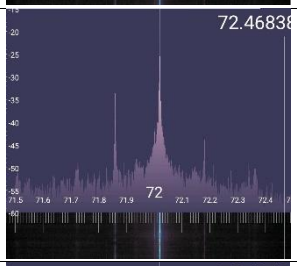
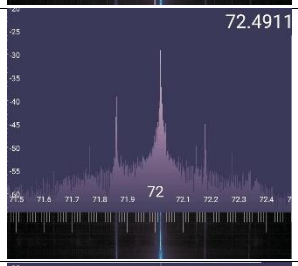
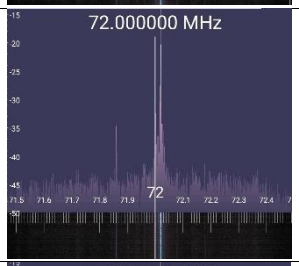
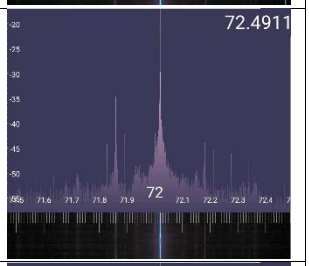
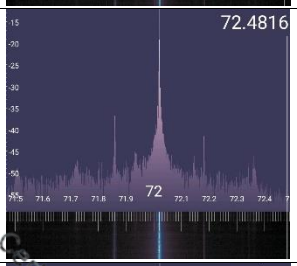
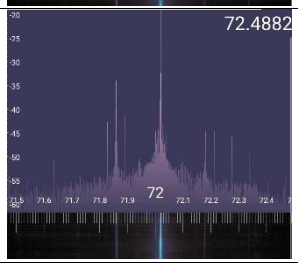
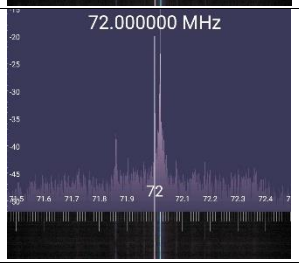
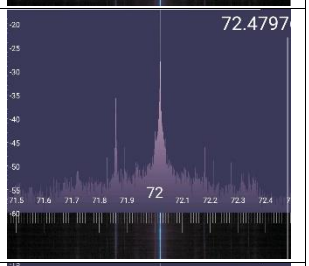
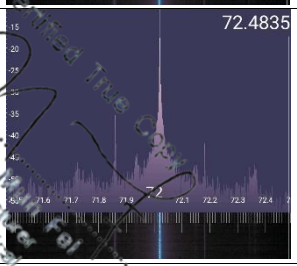
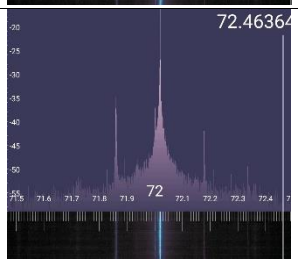
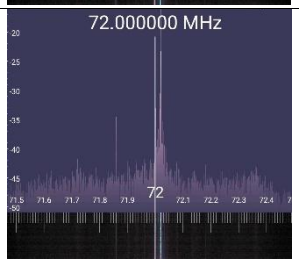
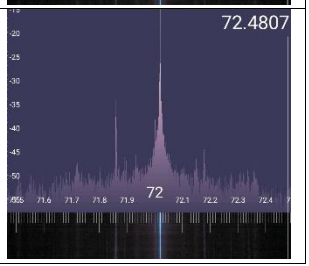
	RS 1	RS 2	RS 3	RS 4
emGuarde off				
1M				
2M				
3M				
4M				
5M				
6M				

Table 9: Electromagnetic noise wave between 71 MHz to 73 MHz for working office

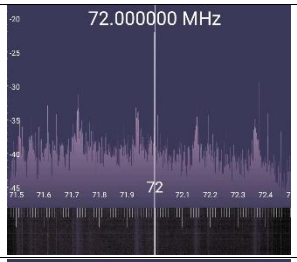
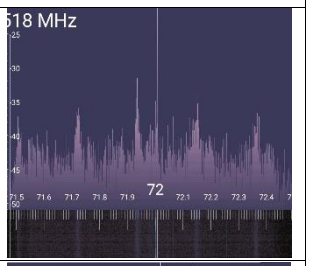
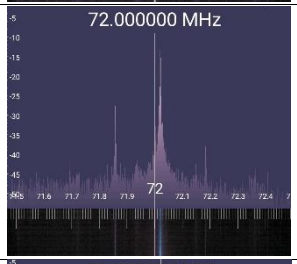
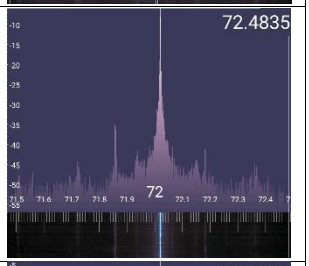
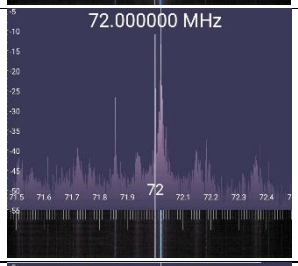
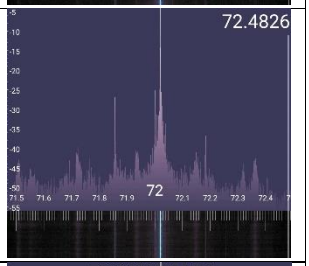
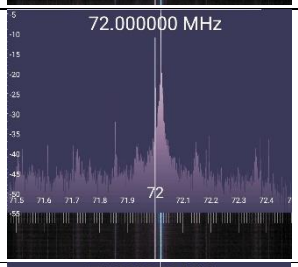
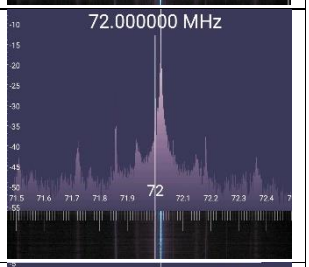
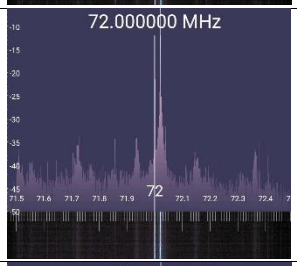
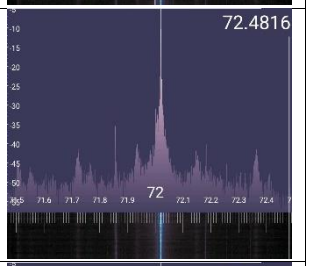
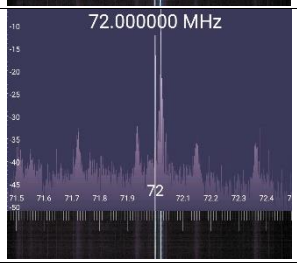
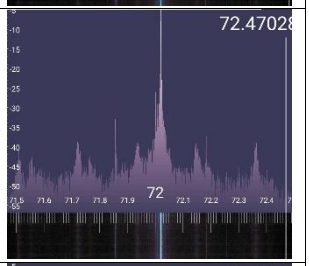
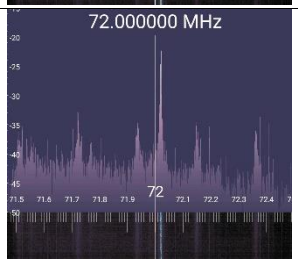
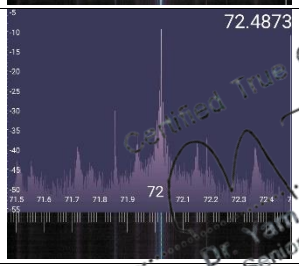
	WO 1	WO 2
emGuarde off		
1M		
2M		
3M		
4M		
5M		
6M		

Table 10: Electromagnetic noise wave between 71 MHz to 73 MHz for laboratories

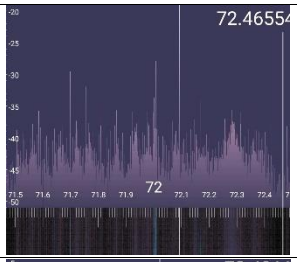
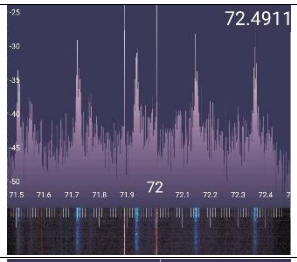
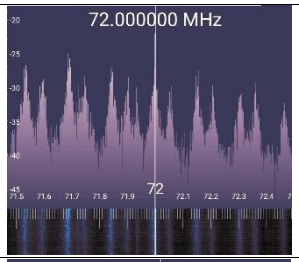
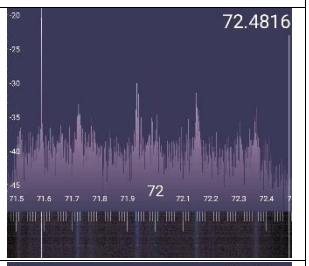
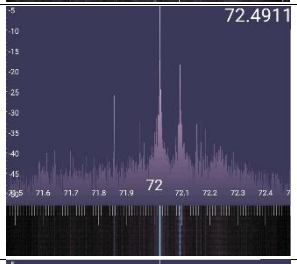
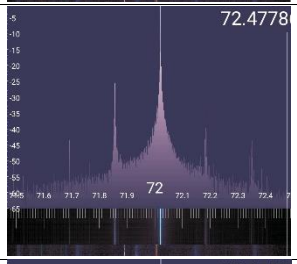
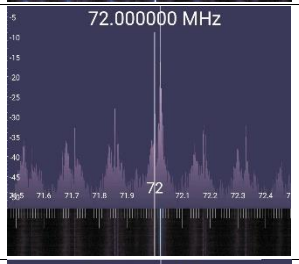
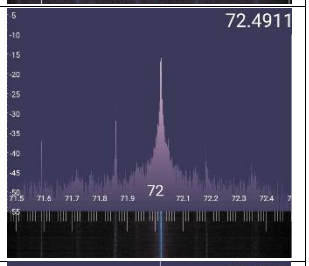
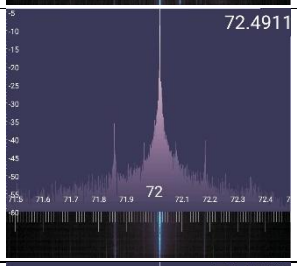
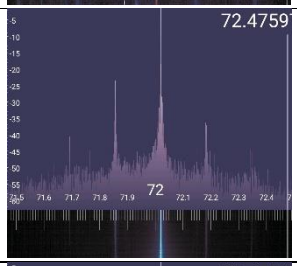
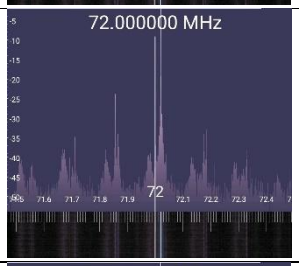
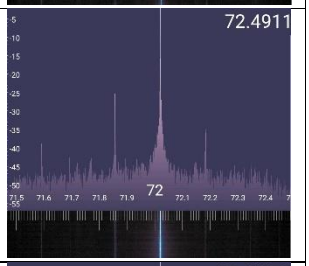
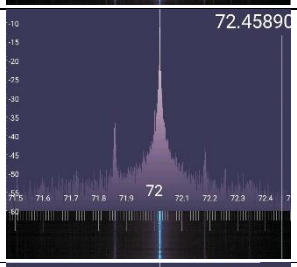
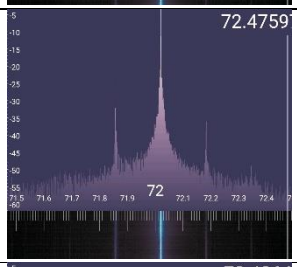
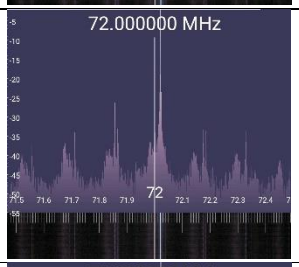
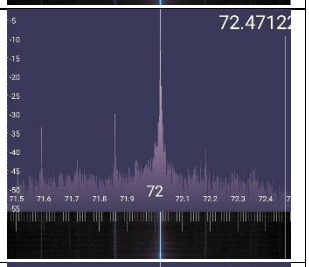
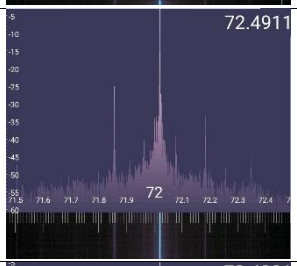
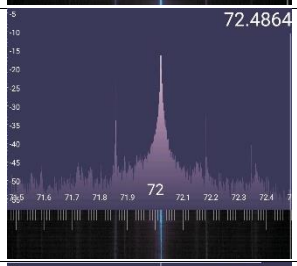
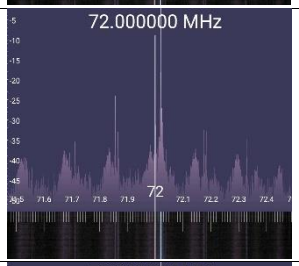
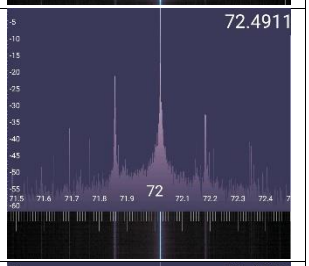
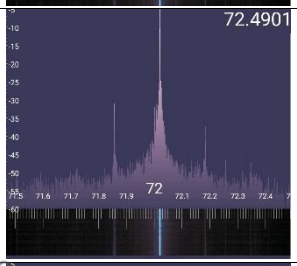
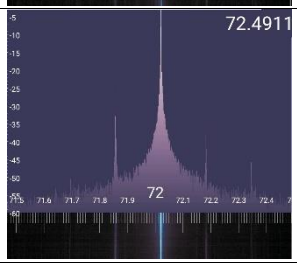
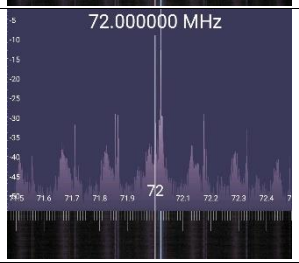
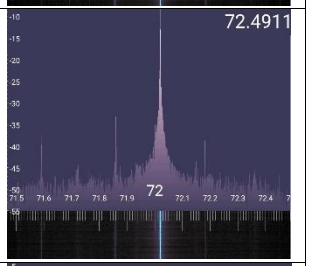
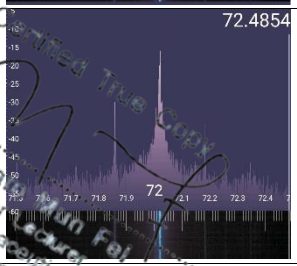
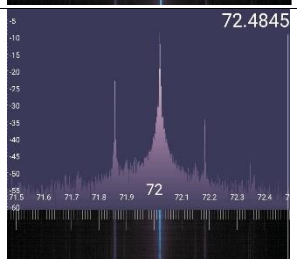
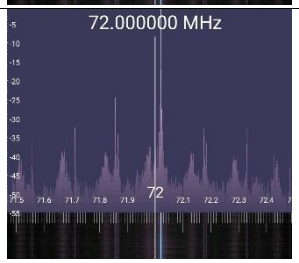
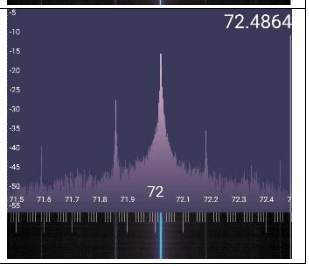
	L 1	L 2	L 3	L 4
emGuarde off				
1M				
2M				
3M				
4M				
5M				
6M				

Table 11: Suppression of electromagnetic noise wave between 107 MHz to 109 MHz by emGuarde at 6 different distance ranges.

Environment	Average signal strength (dB)							Percentage of suppression (%)						Fold decrease					
	emGuarde OFF	emGuarde ON																	
		1M	2M	3M	4M	5M	6M	1M	2M	3M	4M	5M	6M	1M	2M	3M	4M	5M	6M
Residential Space																			
RS1	-19	-31	-25	-22	-22	-22	-21	93.7	74.9	49.9	49.9	49.9	36.9	15.8	4.0	2.0	2.0	2.0	1.6
RS2	-23	-43	-40	-40	-41	-38	-39	99.0	98.0	98.0	98.4	96.8	97.5	100.0	50.1	50.1	63.1	31.6	39.8
RS3	-20	-27	-28	-25	-23	-26	-26	80.0	84.2	68.4	49.9	74.9	74.9	5.0	6.3	3.2	2.0	4.0	4.0
RS4	-17	-33	-25	-21	-21	-17	-19	97.5	84.2	60.2	60.2	0.0	36.9	39.8	6.3	2.5	2.5	1.0	1.6
Working office																			
WO1	-20	-42	-38	-34	-42	-35	-29	99.4	98.4	96.0	99.4	96.8	87.4	158.5	63.1	25.1	158.5	31.6	7.9
WO2	-21	-42	-39	-36	-34	-36	-36	99.2	98.4	96.8	95.0	96.8	96.8	125.9	63.1	31.6	20.0	31.6	31.6
Laboratory																			
L1	-23	-39	-39	-37	-41	-43	-39	97.5	97.5	96.0	98.4	99.0	97.5	39.8	39.8	25.1	63.1	100.0	39.8
L2	-22	-39	-40	-35	-37	-37	-38	98.0	98.4	95.0	96.8	96.8	97.5	50.1	63.1	20.0	31.6	31.6	39.8
L3	-20	-41	-44	-43	-43	-44	-42	99.2	99.6	99.5	99.5	99.6	99.4	125.9	251.2	199.5	199.5	251.2	158.5
L4	-22	-38	-35	-37	-41	-36	-39	97.5	95.0	96.8	98.7	96.0	98.0	39.8	20.0	31.6	79.4	25.1	50.1

Table 12: Chart of percentage of suppression electromagnetic noise wave between 107 MHz to 109 MHz

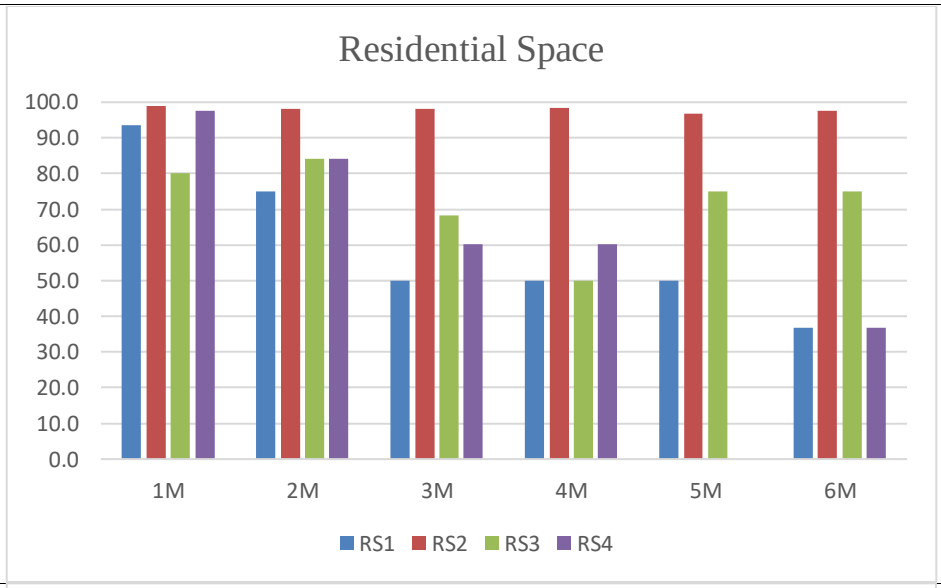
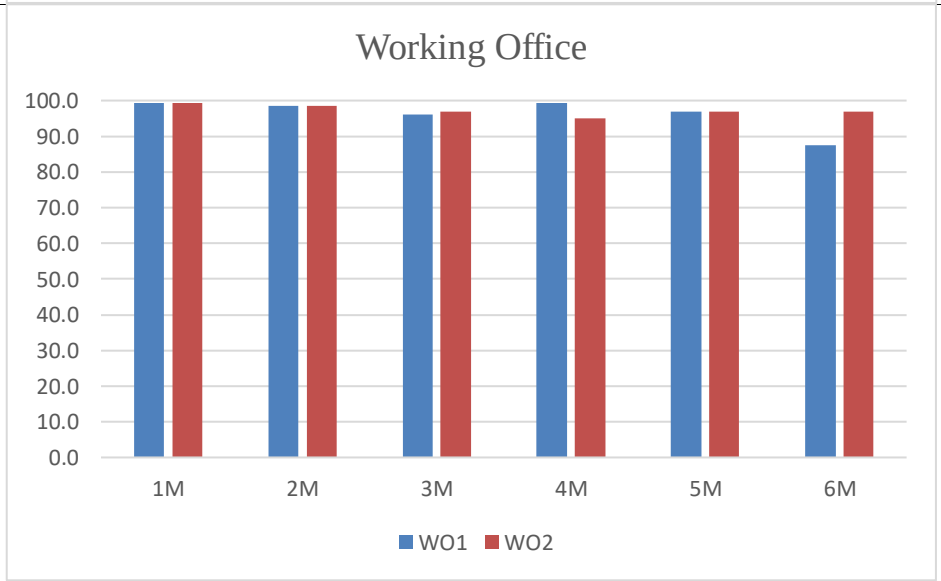
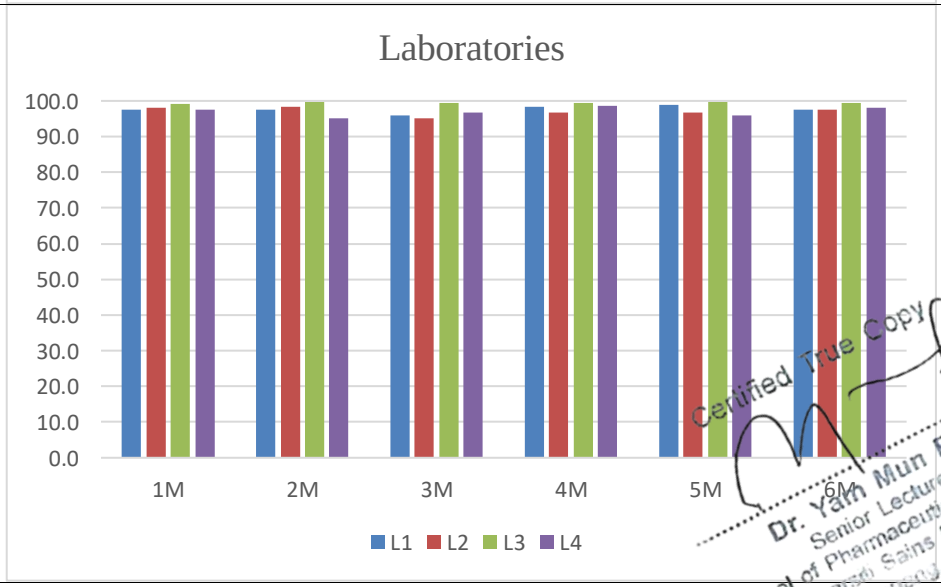
Test environments	Percentage of suppression
Residential Space	
Working office	
Laboratories	

Table 13: Electromagnetic noise wave between 107 MHz to 109 MHz for residential space

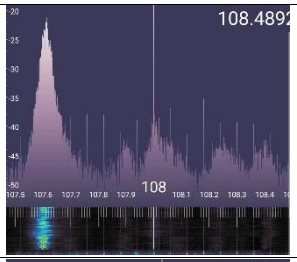
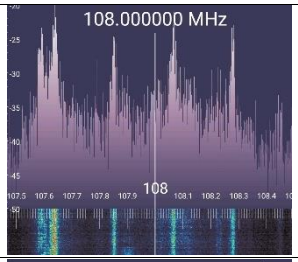
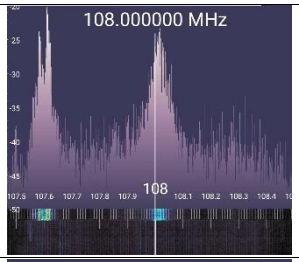
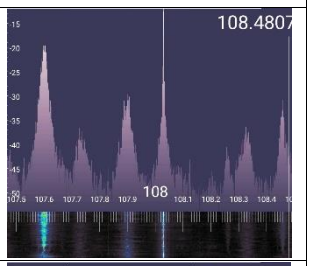
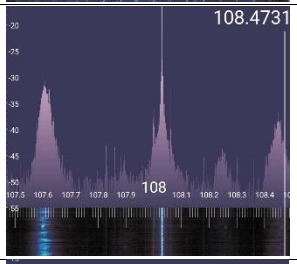
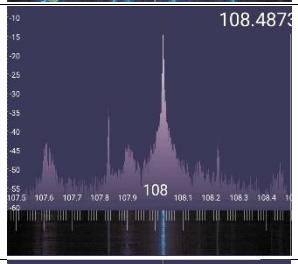
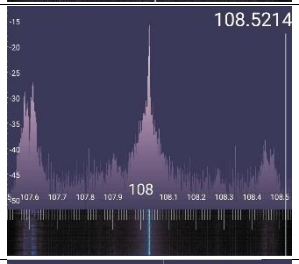
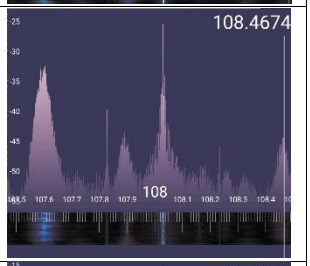
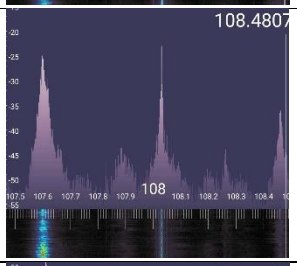
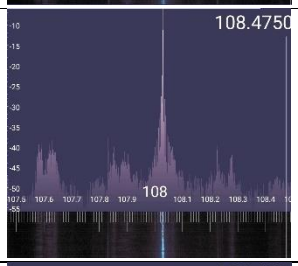
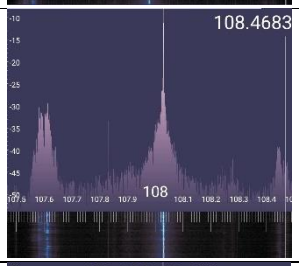
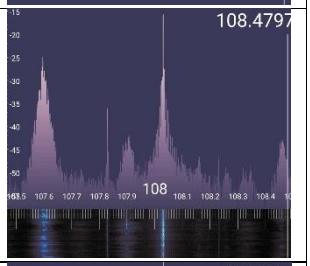
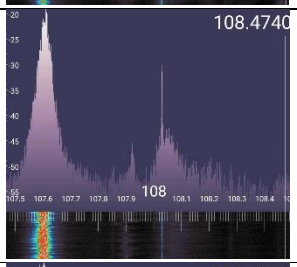
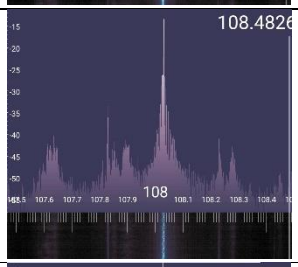
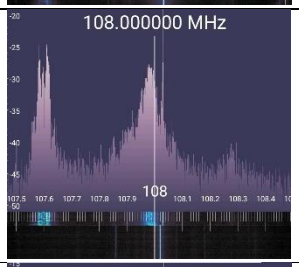
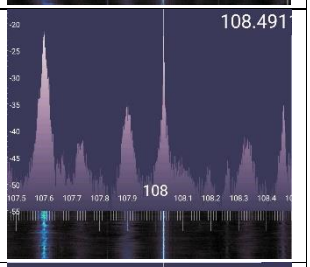
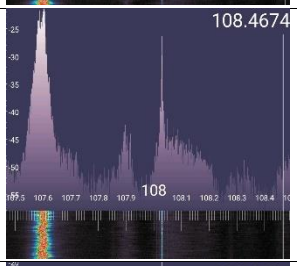
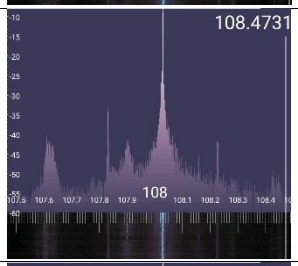
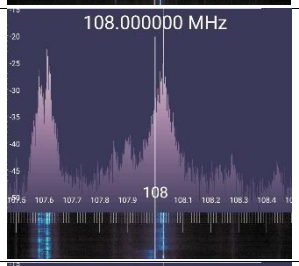
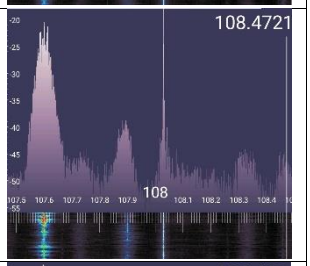
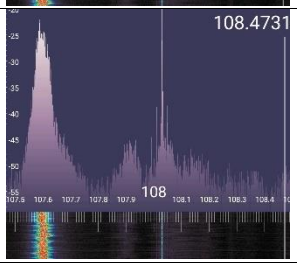
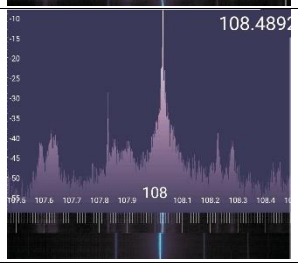
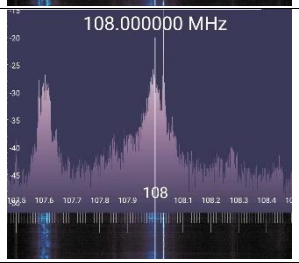
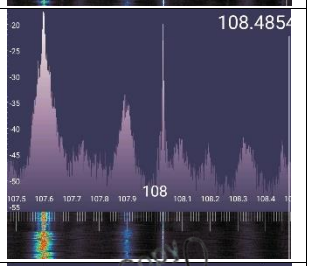
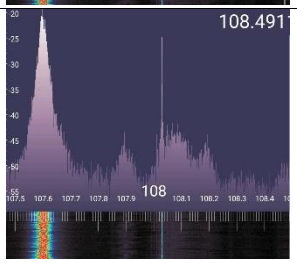
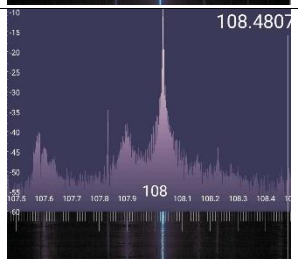
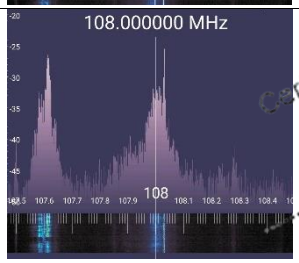
	RS 1	RS 2	RS 3	RS 4
emGuarde off				
1M				
2M				
3M				
4M				
5M				
6M				

Table 14: Electromagnetic noise wave between 107 MHz to 109 MHz for working office

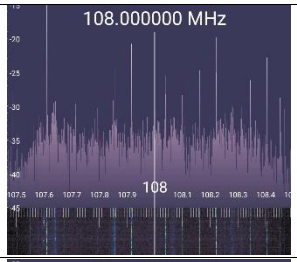
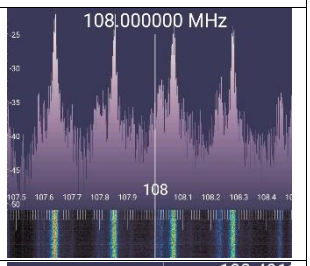
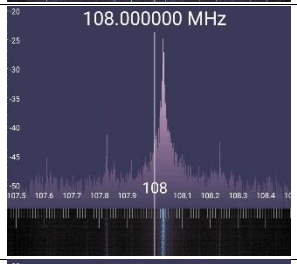
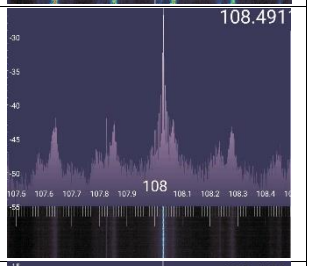
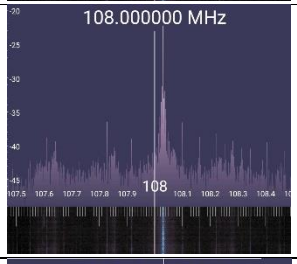
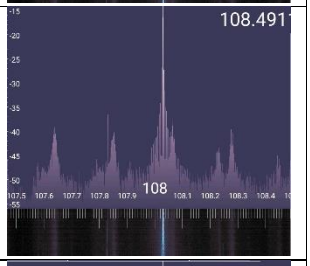
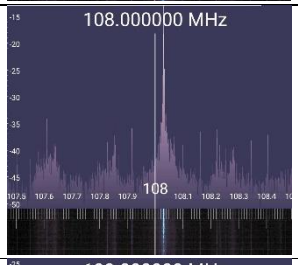
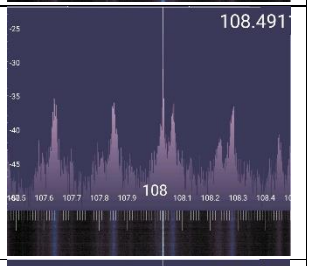
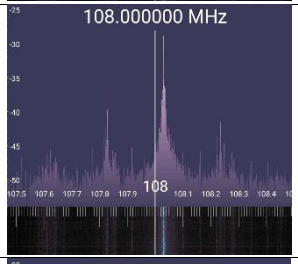
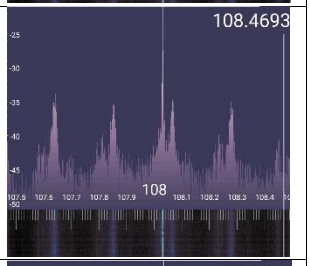
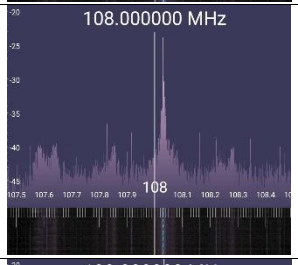
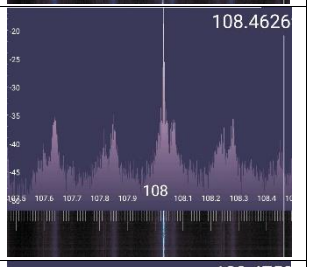
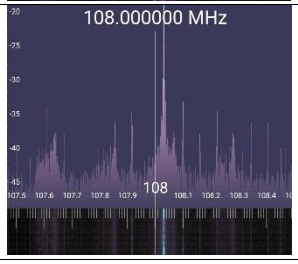
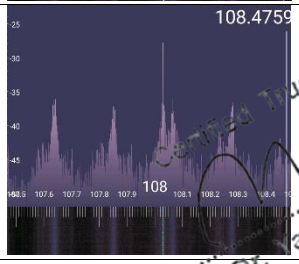
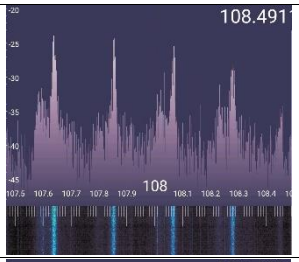
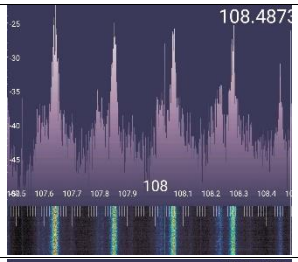
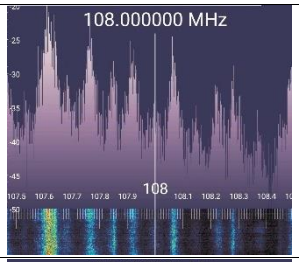
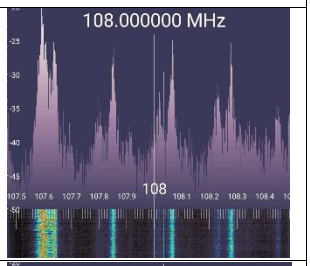
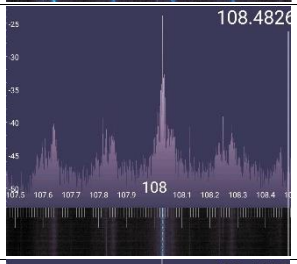
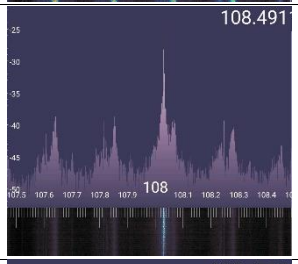
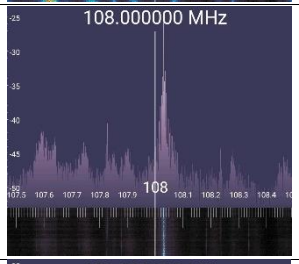
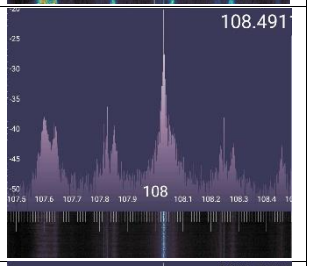
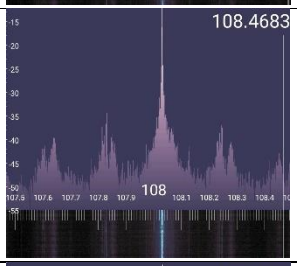
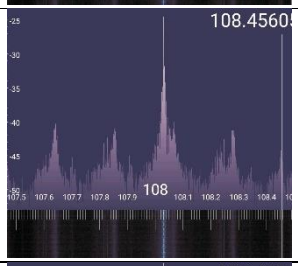
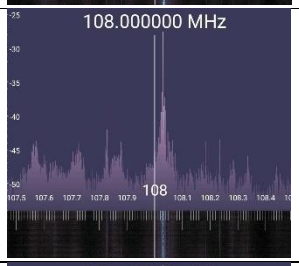
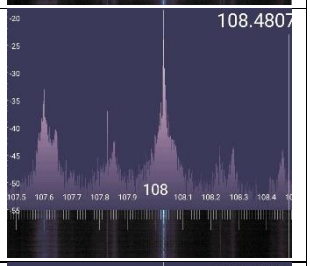
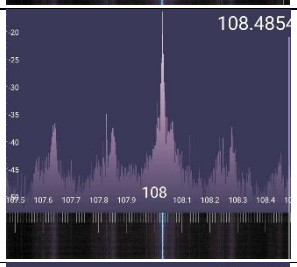
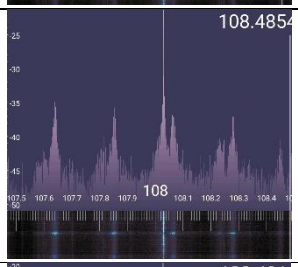
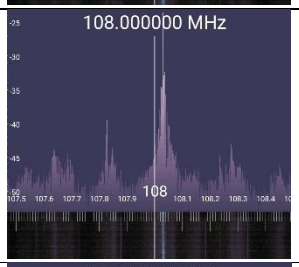
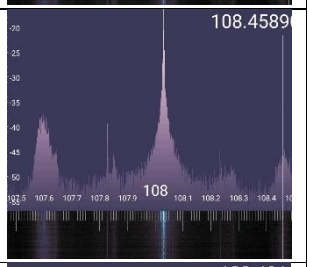
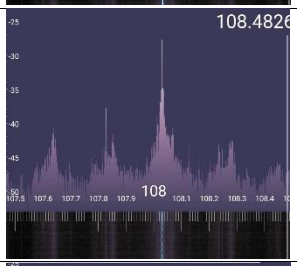
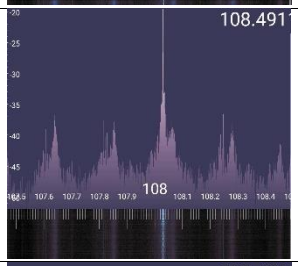
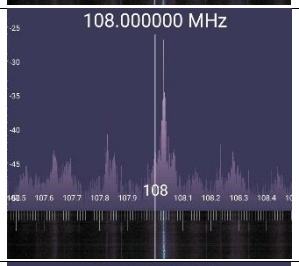
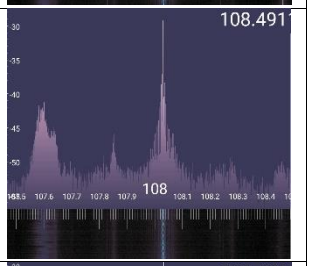
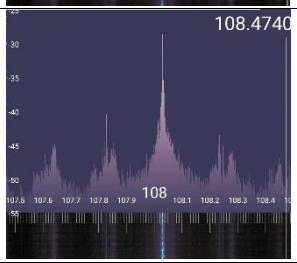
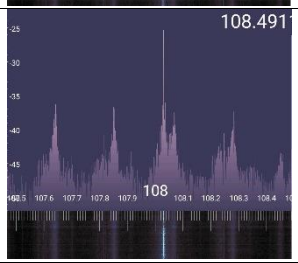
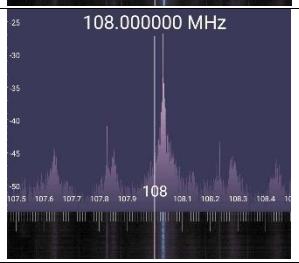
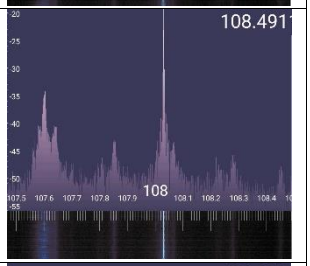
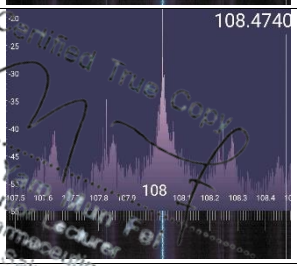
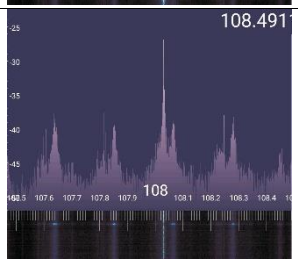
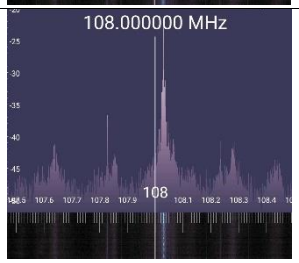
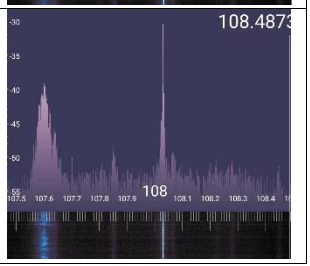
	WO 1	WO 2
emGuarde off		
1M		
2M		
3M		
4M		
5M		
6M		

Table 15: Electromagnetic noise wave between 107 MHz to 109 MHz for laboratories

	L 1	L 2	L 3	L 4
emGuarde off				
1M				
2M				
3M				
4M				
5M				
6M				

Conclusion: The emGuarde Electromagnetic Noise Radiation Harmonizer successfully reduce unwanted electromagnetic noise waves between 35 MHz to 37 MHz, 71MHz to 73 MHz, and 107 MHz to 109 MHz in all test environment until a 6M coverage.

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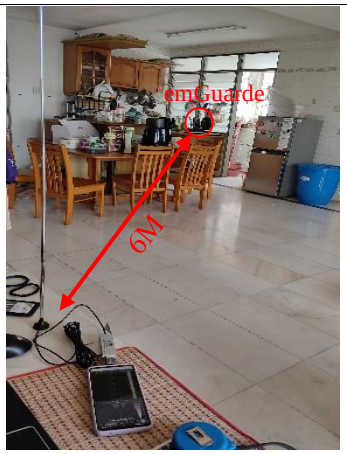
Appendix:

Test location pictures and setup.

	Residential area	Working office	Laboratories
1		 	 
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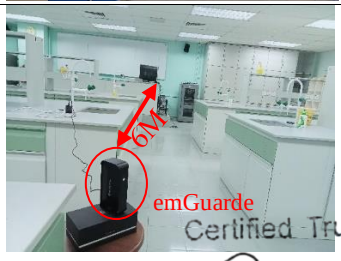
4			

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