FCC TEST REPORT

for

Lelux Electronics Ltd.

VISITOR CHIME AND WATCH DOG/ALARM

Model Number:639S

FCC ID: NS3639S

Prepared for	:	Lelux Electronics Ltd.
Address	:	Unit 6, 10/F, TCL Tower, No.8, Tai Chung Road, Tsuen Wan, New Territories, Hong Kong
Prepared by	:	Keyway Testing Technology Co., Ltd.
Address	:	Baishun Industrial Zone, Zhangmutou Town, Dongguan, Guangdong, China
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Report No.	:	15KWE012368F
Date of Test	:	Jan. 23~26, 2015
Date of Report	:	Jan. 27, 2014

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Keyway Testing Technology Co., Ltd.

Applicant: **Address:**	Lelux Electronics Ltd.. Unit 6, 10/F, TCL Tower, No.8, Tai Chung Road, Tsuen Wan, New Territories, Hong Kong		
Manufacturer: **Address:**	Lelux Electronics Ltd.. Unit 6, 10/F, TCL Tower, No.8, Tai Chung Road, Tsuen Wan, New Territories, Hong Kong		
E.U.T:	VISITOR CHIME AND WATCH DOG/ALARM		
Model Number:	639S		
Trade Name:	HomeSafe®	**Serial No.:**	------
Date of Receipt:	Jan. 23, 2015	**Date of Test:**	Jan. 23~26, 2015
Test Specification:	FCC Part 15, Subpart C: Oct. 1, 2014 ANSI C63.4:2009		
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied. **Issue Date: Jan. 27, 2015**		

Tested by:	Reviewed by:	Approved by:
Jack	Andy	Jade Yang
Jack Bu / Engineer	Andy Gao / Supervisor	Jade Yang / Supervisor

Other Aspects:

None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

1. TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Emissions	15.209 15.249(a)(d)	PASS
20dB Bandwidth	15.249	PASS
Emissions from out of band	15.249(d)	PASS
Antenna Requirement	15.203	PASS

2.GENERAL PRODUCT INFORMATION

2.1. Product Function

Refer to Technical Construction Form and User Manual.

2.2. Description of Device (EUT)

Description	:	VISITOR CHIME AND WATCH DOG/ALARM
M/N	:	639S
Power Supply	:	DC 12V (1.5V Battery*8) DC 12V from adapter
Operation Frequency	:	2405~2480MHz
Channel spacing	:	500kHz
Modulation Technology	:	FSK
Antenna Type	:	Permanent connection antenna
Antenna Gain	:	2dBi
Adapter	:	Manufacturer: GOLDEN PROFIT ELECTRONICS LTD. M/N:GPE125-120050-1 I/P:AC 100~240V 50/60Hz 0.4A O/P:DC 12V 0.5A

2.3. Independent Operation Modes

The basic operation modes are:

2.3.1. Transmitting mode (TX Mode)

Low: 2405MHz
Middle: 2442MHz
High: 2480MHz

2.3.2. Normal mode.

2.4. Channel list

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2405	76	2442.5
2	2405.5	~	~
~	~	150	2479.5
74	2441.5	151	2480
75	2442		

3. TEST SITES

3.1. Test Facilities

Lab Qualifications : 944 Shielded Room built by ETS-Lindgren, USA
Date of completion: March 28, 2011

966 Chamber built by ETS-Lindgren, USA
Date of completion: March 28, 2011

Certificated by TUV Rheinland, Germany.
Registration No.: UA 50207153
Date of registration: July 13, 2011

Certificated by UL, USA
Registration No.: 100567-237
Date of registration: September 1, 2011

Certificated by Intertek
Registration No.: 2011-RTL-L1-31
Date of registration: October 11, 2011

Certificated by FCC, USA
Registration No.: 370994
Date of registration: February 21, 2012

Certificated by Industry Canada
Registration No.: 9868A
Date of registration: December 8, 2011

3.2. List of Test and Measurement Instruments

3.2.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr. 27,14	Apr. 27,15
Artificial Mains Network	Rohde&Schwarz	ENV216	101315	Apr. 27,14	Apr. 27,15
Artificial Mains Network (AUX)	Rohde&Schwarz	ENV216	101314	Apr. 27,14	Apr. 27,15
RF Cable	FUJIKURA	3D-2W	944 Cable	Apr. 27,14	Apr. 27,15

3.2.2. For radiated emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr. 27,14	Apr. 26,15
Bilog Antenna	ETS-LINDGREEN	3142D	135452	Apr. 27,14	Apr. 26,15
Loop antenna	teseq	HLA6120	22032	Apr. 30,14	Apr. 29,15
3m Semi-anechoic Chamber	ETS-LINDGREEN	966	KW01	Apr. 27,14	Apr. 26,15
Signal Amplifier	SONOMA	310	187016	Apr. 27,14	Apr. 26,15
Signal Amplifier	Agilent	8449B	3008A00251	Apr. 27,14	Apr. 26,15
RF Cable	IMRO	IMRO-400	966 Cable 1#	Apr. 27,14	Apr. 26,15
MULTI-DEVICE Controller	ETS-LINDGREEN	2090	126913	N/A	N/A
Horn Antenna	DAZE	ZN30701	11003	Apr. 27,14	Apr. 26,15
Horn Antenna	SCHWARZBECK	BBHA9170	9170-068	Apr. 27,14	Apr. 26,15
Spectrum Analyzer	Agilent	8593E	3911A04271	Apr. 27,14	Apr. 26,15
Spectrum Analyzer	Agilent	E4408B	MY44211125	Apr. 30,14	Apr. 29,15
Signal Amplifier	DAZE	ZN3380C	11001	Apr. 27,14	Apr. 26,15

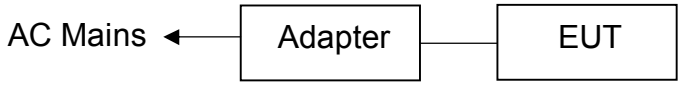
4. TEST SET-UP AND OPERATION MODES

4.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

4.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: VISITOR CHIME AND WATCH DOG/ALARM)

4.3. Test Operation Mode and Test Software

Refer to Test Setup in clause 4.

4.4. Special Accessories and Auxiliary Equipment

None.

4.5. Countermeasures to Achieve EMC Compliance

None.

4.6. Test Environment:

Ambient conditions in the test laboratory:

Items	Actual
Temperature (℃)	21~23
Humidity (%RH)	50~65

5. EMISSION TEST RESULTS

5.1. Conducted Emission at the Mains Terminals Test

5.1.1. 15.207 limits

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

5.1.2. Test Setup

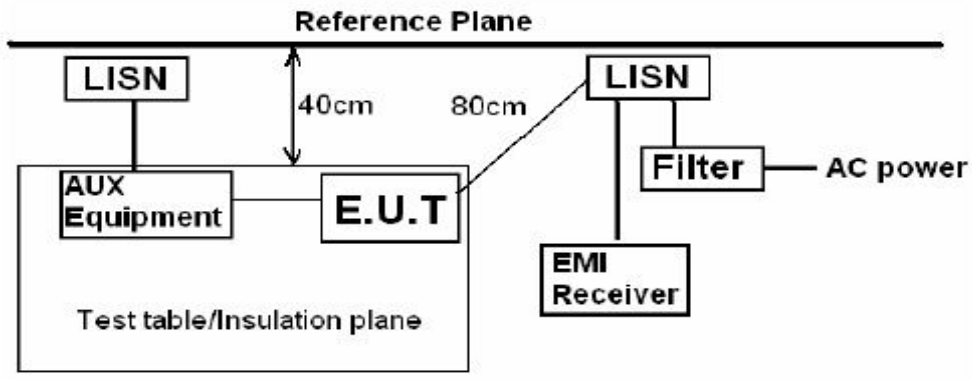
The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the centre so as to form a bundle no longer than 0.4 m.

The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.

The frequency range from 150 kHz to 30 MHz was investigated.

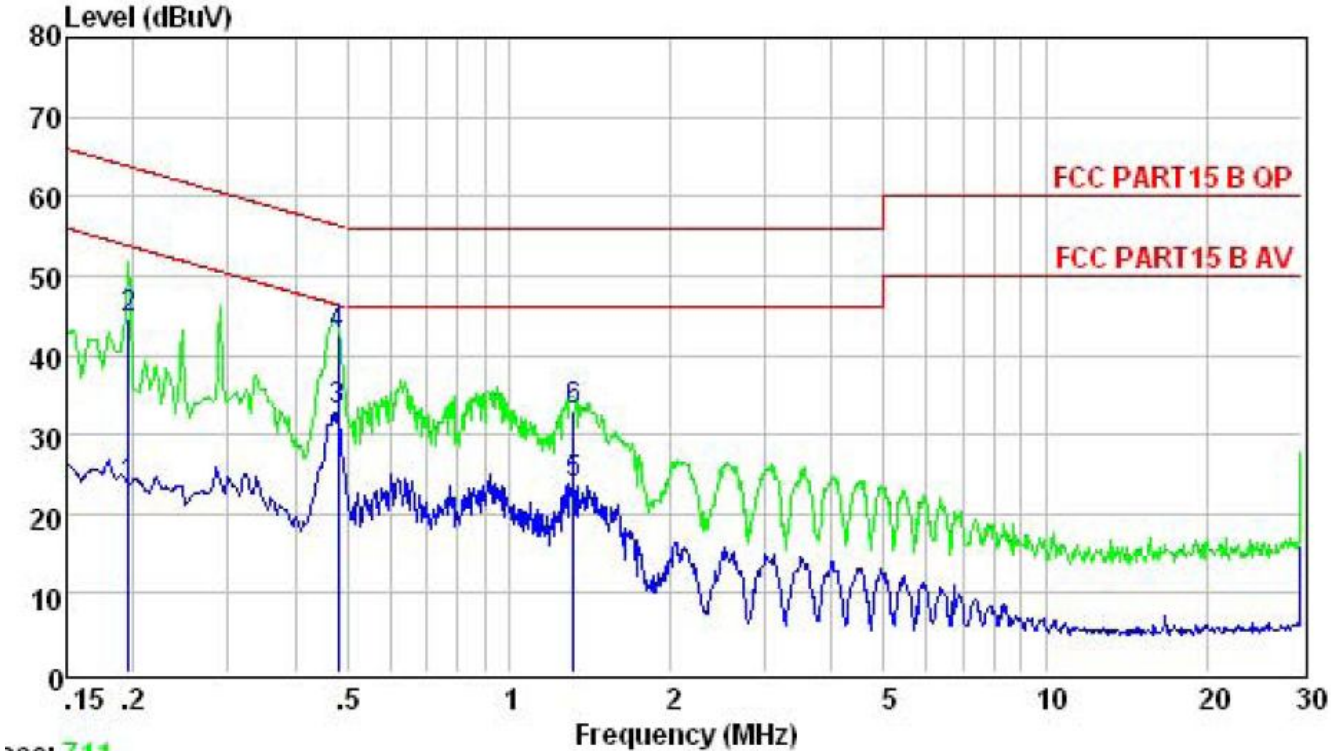
The bandwidth of the test receiver was set at 9 kHz.
Measurement Uncertainty: ±2.6 dB at a level of confidence of 95%.

Pretest for all mode, The test data of the worst case condition(s) was reported on the following page.



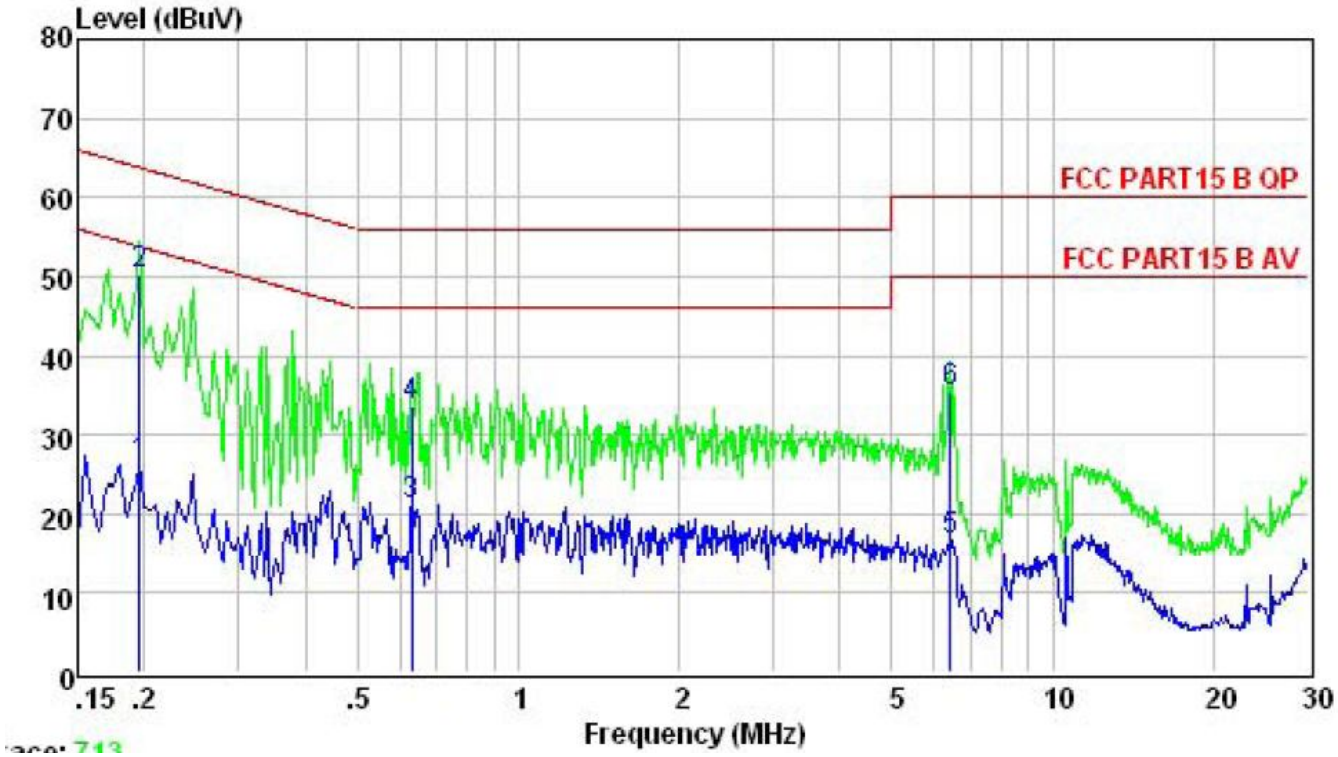
Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

TX Mode(LOW CHANNEL)
Line:



	Freq	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	
1	0.195	23.46	53.80	-30.34	Average
2	0.195	44.62	63.80	-19.18	QP
3	0.481	33.09	46.32	-13.23	Average
4	0.481	42.58	56.32	-13.74	QP
5	1.317	23.90	46.00	-22.10	Average
6	1.317	32.98	56.00	-23.02	QP

Neutral



	Freq	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	
1	0.195	26.32	53.80	-27.48	Average
2	0.195	50.12	63.80	-13.68	QP
3	0.634	21.14	46.00	-24.86	Average
4	0.634	33.59	56.00	-22.41	QP
5	6.420	16.66	50.00	-33.34	Average
6	6.420	35.28	60.00	-24.72	QP

5.2. Radiated Emission Test

5.2.1. Limit 15.209 limits

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

5.2.2. Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

5.2.3. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

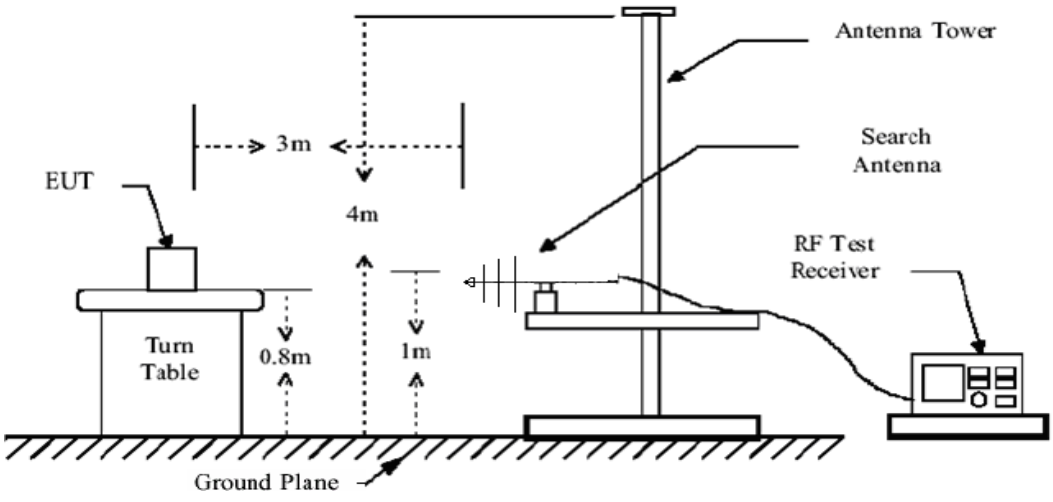
The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz. The frequency range from 30MHz to 10th harmonic (25GHz) are checked

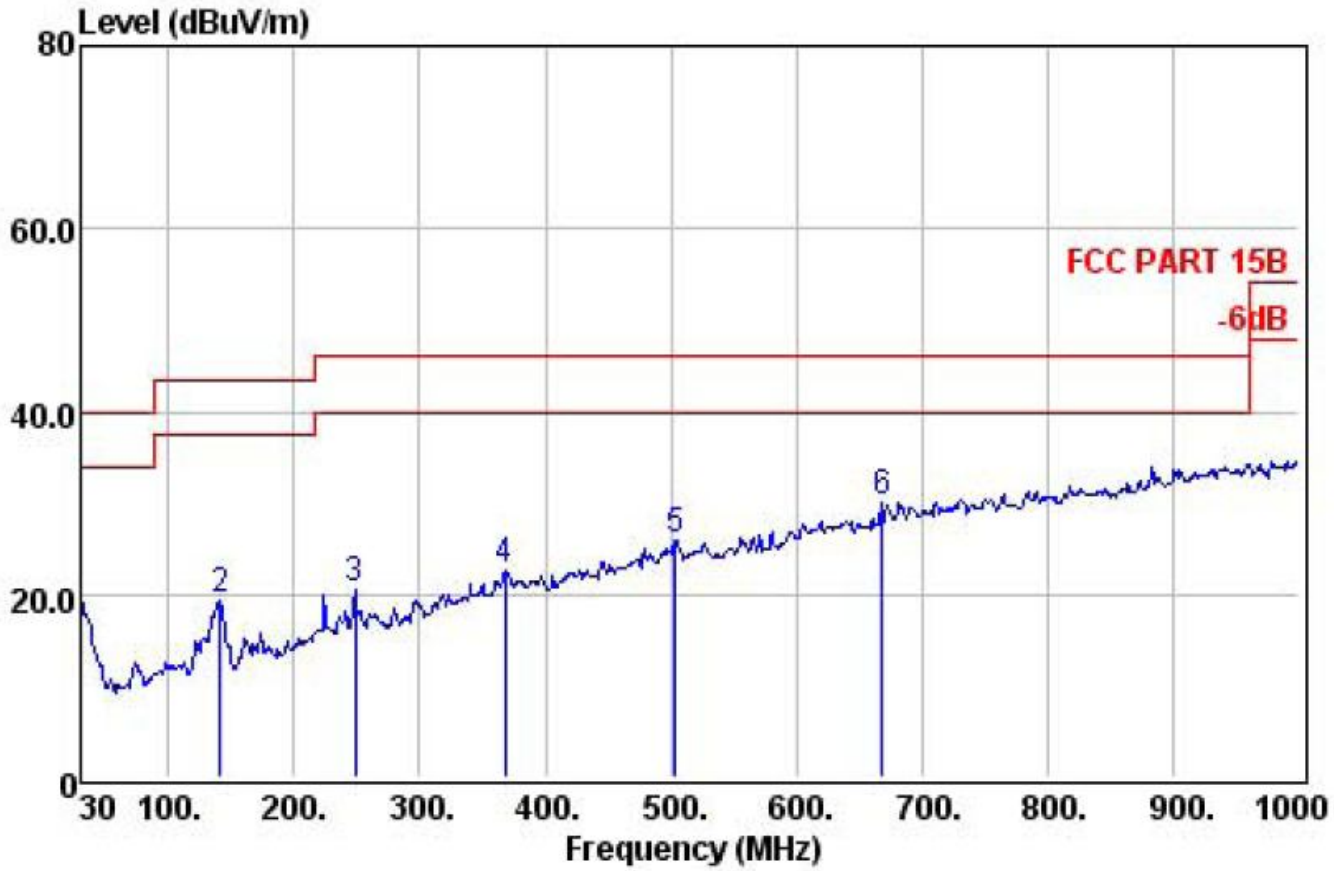
The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz.

The test data of the worst case condition(s) was reported on the following pages.

Notes:
1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.
3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
4: The emission of below 30MHz is background, the data no show it.
5: below 1GHz,we pretest all mode, the TX mode was worst and the data recording in the report.
6: For battery and adapter mode, the worst mode was connect adapter and the data recording in the report.

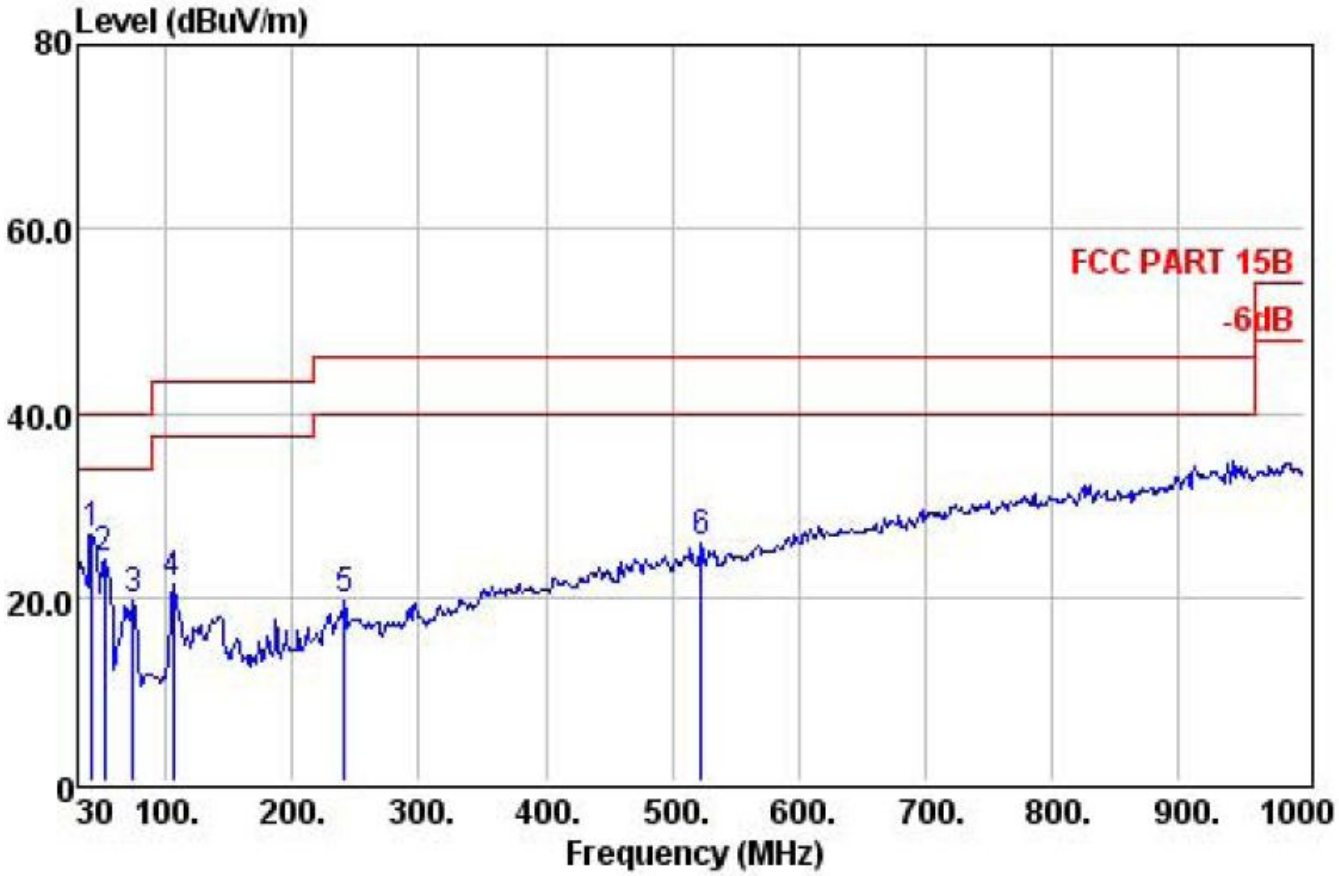


Below 1GHz (LOW CHANNEL)
Horizontal polarizations



	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	30.00	31.41	34.28	0.56	18.80	22.23	40.00	-17.77	QP
2	141.55	31.22	40.72	1.22	8.49	19.21	43.50	-24.29	QP
3	248.25	30.96	36.86	1.70	12.85	20.45	46.00	-25.55	QP
4	367.56	30.61	34.79	2.18	16.15	22.51	46.00	-23.49	QP
5	503.36	30.60	34.96	2.85	18.77	25.98	46.00	-20.02	QP
6	668.26	30.79	35.20	3.69	21.84	29.94	46.00	-16.06	QP

Vertical polarizations



	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	41.64	31.38	45.37	0.56	12.23	26.78	40.00	-13.22	QP
2	51.34	31.38	46.22	0.75	8.60	24.19	40.00	-15.81	QP
3	73.65	31.33	42.51	0.85	7.68	19.71	40.00	-20.29	QP
4	105.66	31.33	42.31	1.03	9.43	21.44	43.50	-22.06	QP
5	241.46	30.95	36.41	1.61	12.66	19.73	46.00	-26.27	QP
6	522.76	30.69	34.44	2.94	19.16	25.85	46.00	-20.15	QP

Above 1GHz

2405MHz Horizontal polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2405.00	26.32	79.57	7.39	28.73	89.37	94.00	-4.63	Average
2	2405.00	26.32	92.84	7.39	28.73	102.64	114.00	-11.36	Peak
3	4810.00	27.49	32.90	11.96	32.94	50.31	54.00	-3.69	Average
4	4810.00	27.49	36.86	11.96	32.94	54.27	74.00	-19.73	Peak
5	6916.00	27.88	18.12	16.60	36.98	43.82	74.00	-30.18	Peak
6	11863.00	28.99	14.98	17.34	39.54	42.87	74.00	-31.13	Peak

2405MHz Vertical polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2405.00	26.32	79.51	7.39	28.73	89.31	94.00	-4.69	Average
2	2405.00	26.32	92.38	7.39	28.73	102.18	114.00	-11.82	Peak
3	4810.00	27.49	32.67	11.96	32.94	50.08	54.00	-3.92	Average
4	4810.00	27.49	36.77	11.96	32.94	54.18	74.00	-19.82	Peak
5	9245.00	28.50	17.40	16.90	37.69	43.49	74.00	-30.51	Peak
6	12985.00	29.20	14.84	18.20	40.66	44.50	74.00	-29.50	Peak

2442MHz Horizontal polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2442.00	26.33	79.46	7.48	28.76	89.37	94.00	-4.63	Average
2	2442.00	26.33	92.35	7.48	28.76	102.26	114.00	-11.74	Peak
3	4884.00	27.53	33.30	12.19	33.11	51.07	54.00	-2.93	Average
4	4884.00	27.53	36.42	12.19	33.11	54.19	74.00	-19.81	Peak
5	9075.00	28.43	19.08	16.88	37.48	45.01	74.00	-28.99	Peak
6	13325.00	29.26	13.67	18.59	42.21	45.21	74.00	-28.79	Peak

2442MHz Vertical polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2442.00	26.33	79.46	7.48	28.76	89.37	94.00	-4.63	Average
2	2442.00	26.33	92.30	7.48	28.76	102.21	114.00	-11.79	Peak
3	4884.00	27.53	32.41	12.19	33.11	50.18	54.00	-3.82	Average
4	4884.00	27.53	35.50	12.19	33.11	53.27	74.00	-20.73	Peak
5	8548.00	28.26	19.15	16.78	36.86	44.53	74.00	-29.47	Peak
6	12424.00	29.08	18.82	17.73	39.49	46.96	74.00	-27.04	Peak

2480MHz Horizontal polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2480.00	26.34	79.34	7.57	28.79	89.36	94.00	-4.64	Average
2	2480.00	26.34	92.16	7.57	28.79	102.18	114.00	-11.82	Peak
3	4960.00	27.58	32.08	12.36	33.32	50.18	54.00	-3.82	Average
4	4960.00	27.58	35.06	12.36	33.32	53.16	74.00	-20.84	Peak
5	7341.00	27.97	15.17	16.62	37.34	41.16	74.00	-32.84	Peak
6	12135.00	29.03	14.12	17.49	39.43	42.01	74.00	-31.99	Peak

2480MHz Vertical polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2480.00	26.34	77.14	7.57	28.79	87.16	94.00	-6.84	Average
2	2480.00	26.34	94.29	7.57	28.79	104.31	114.00	-9.69	Peak
3	4960.00	27.58	33.09	12.36	33.32	51.19	54.00	-2.81	Average
4	4960.00	27.58	36.21	12.36	33.32	54.31	74.00	-19.69	Peak
5	7154.00	27.93	16.05	16.61	37.26	41.99	74.00	-32.01	Peak
6	10503.00	28.85	14.59	17.07	39.20	42.01	74.00	-31.99	Peak

6. 20DB OCCUPY BANDWIDTH

6.1. Limits

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

6.2. Test setup

1. Set the RBW =100kHz.
2. Set the VBW = 100kHz
3. Span=3MHz
4. Detector = peak.
5. Sweep time = auto couple.
6. Allow trace to fully stabilize, and view the plot.
7. Measure and record the result in the test report.

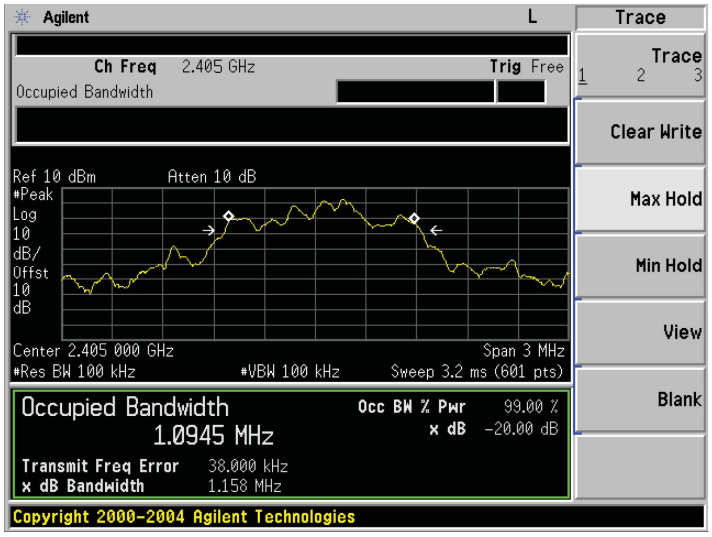
Measurement Uncertainty: ±500kHz at a level of confidence of 95%.

Test data:

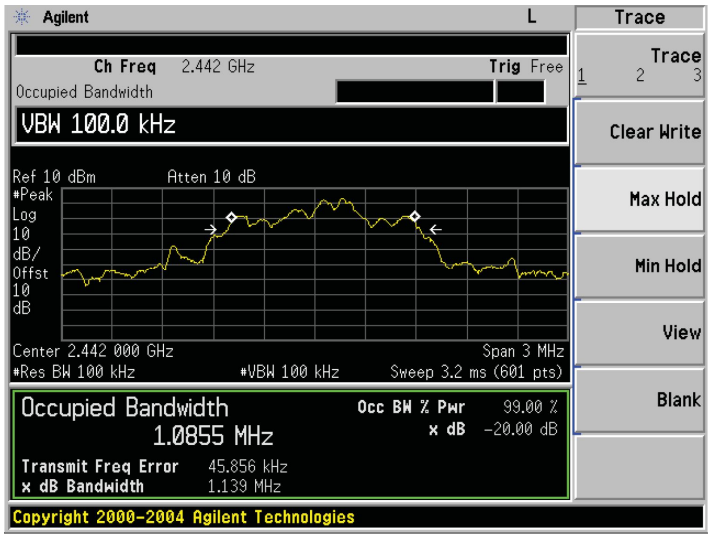
	Channel Frequency (MHz)	20dB Bandwidth (MHz)	Result
	2405	1.158	Pass
	2442	1.139	Pass
	2480	1.162	Pass

Test plot as follows:

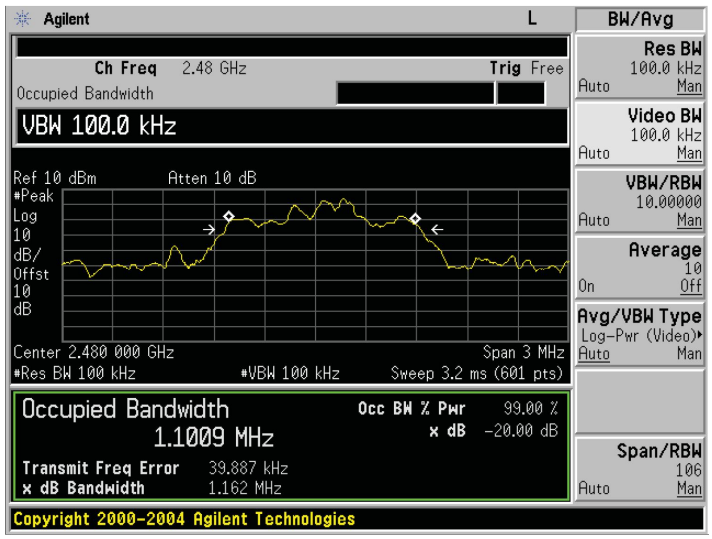
2405MHz



2442 MHz



2480 MHz



7. BAND EDGE COMPLIANCE TEST

7.1. Limits

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

7.2. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz. The detector is peak for all tests.
Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

Test data as follows:

Frequency (MHz)	Antenna polarization (H/V)	Test Frequency (MHz)	Emission (dBuV/m)	Band edge Limit (dBuV/m)		Result
			PK	PK	AV	Pass
<2400	H	2398.45	50.37	74.00	54.00	Pass
<2400	V	2397.78	49.68	74.00	54.00	Pass
>2483.5	H	2487.26	50.07	74.00	54.00	Pass
>2483.5	V	2488.69	49.71	74.00	54.00	Pass

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

8. ANTENNA REQUIREMENTS

8.1. Limits

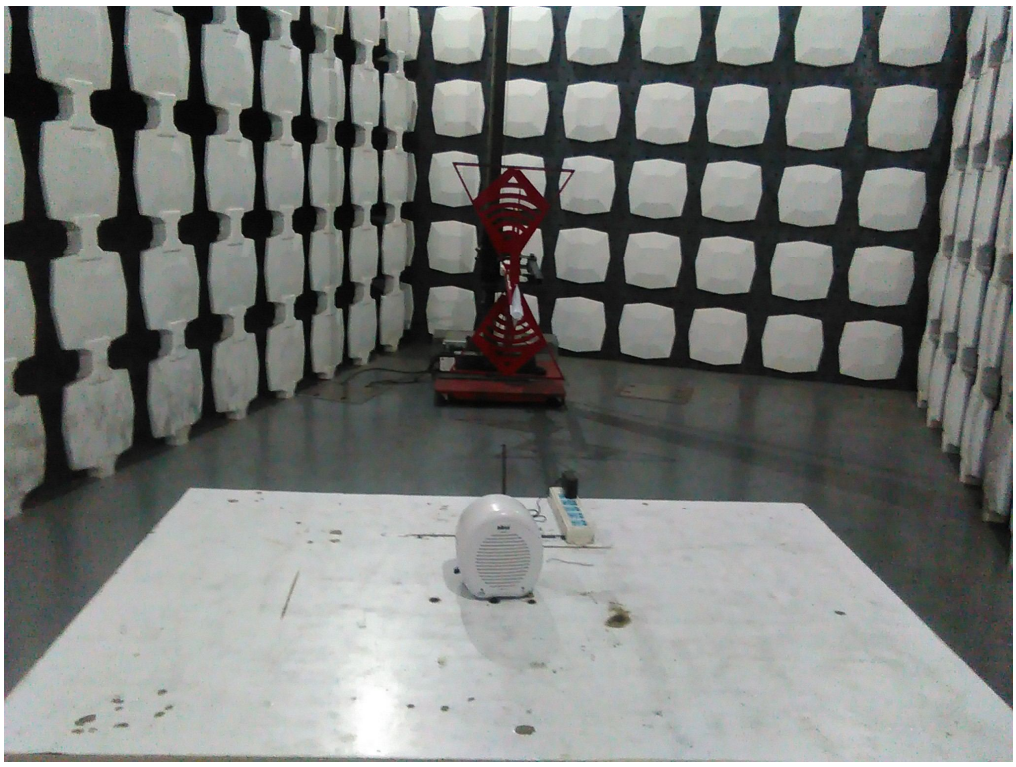
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.2. Result

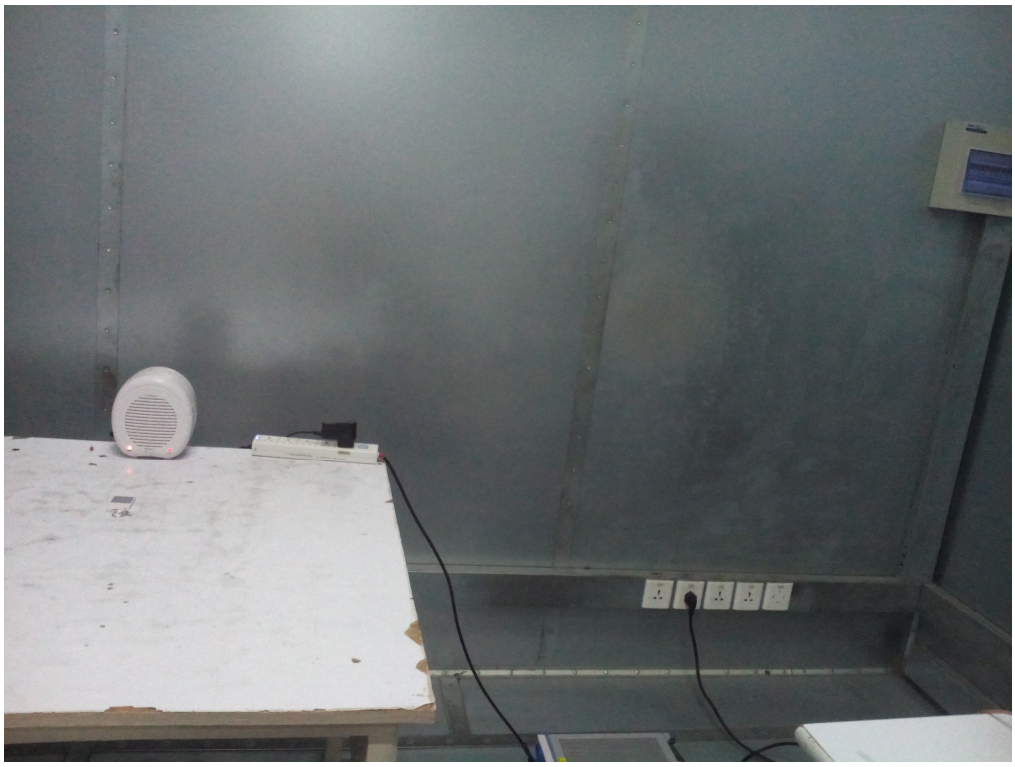
The antennas used for this product are Permanent connection antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2dBi.

9. PHOTOGRAPHS OF TEST SET-UP

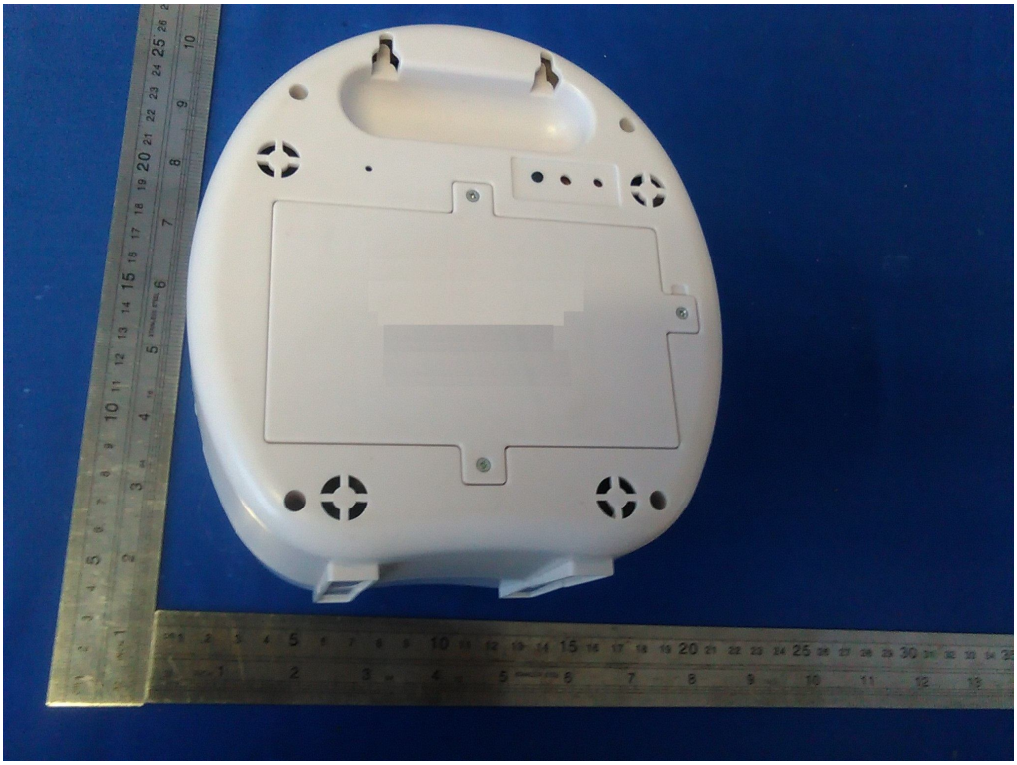
Radiated Emission

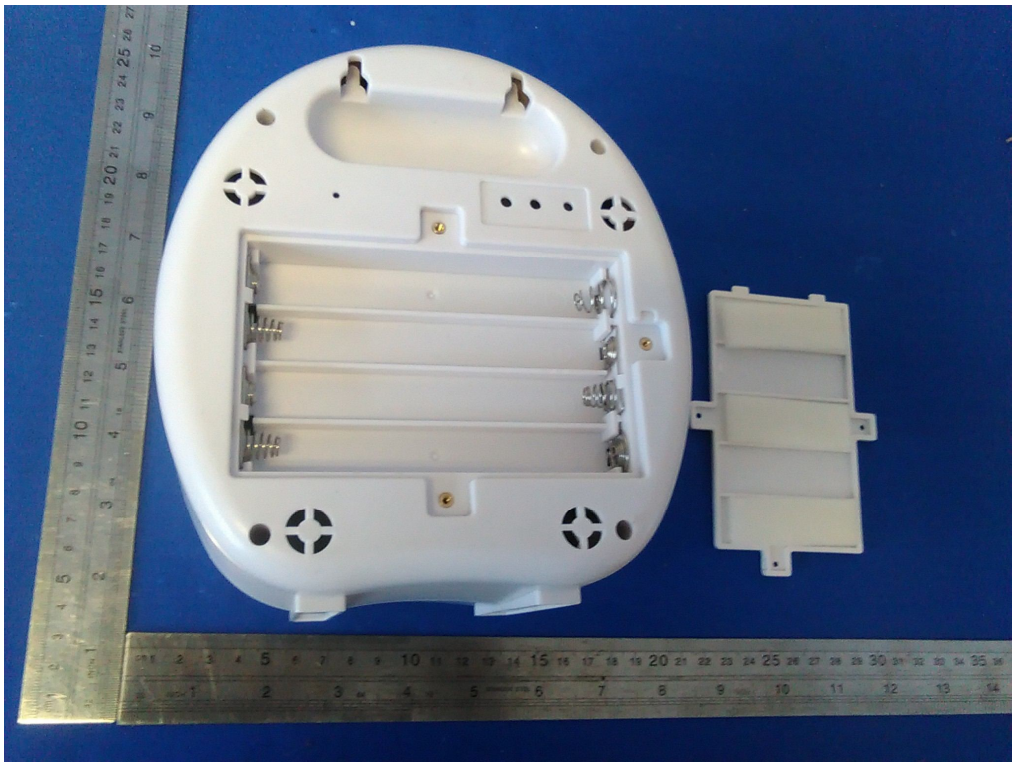


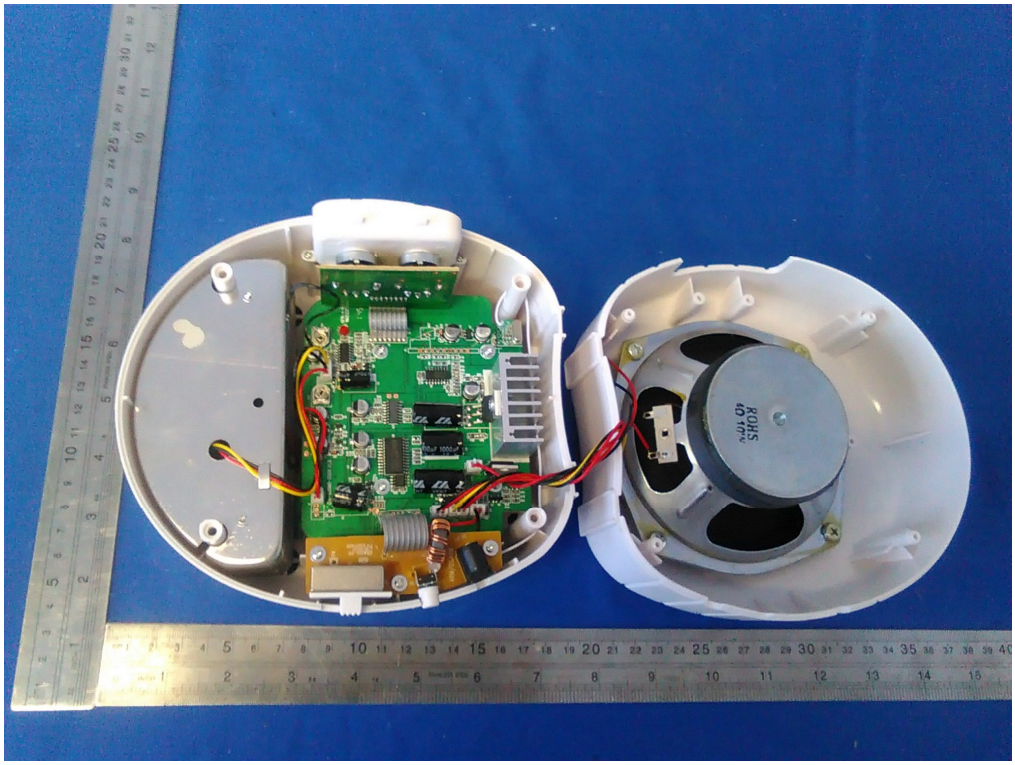
Conducted Emission

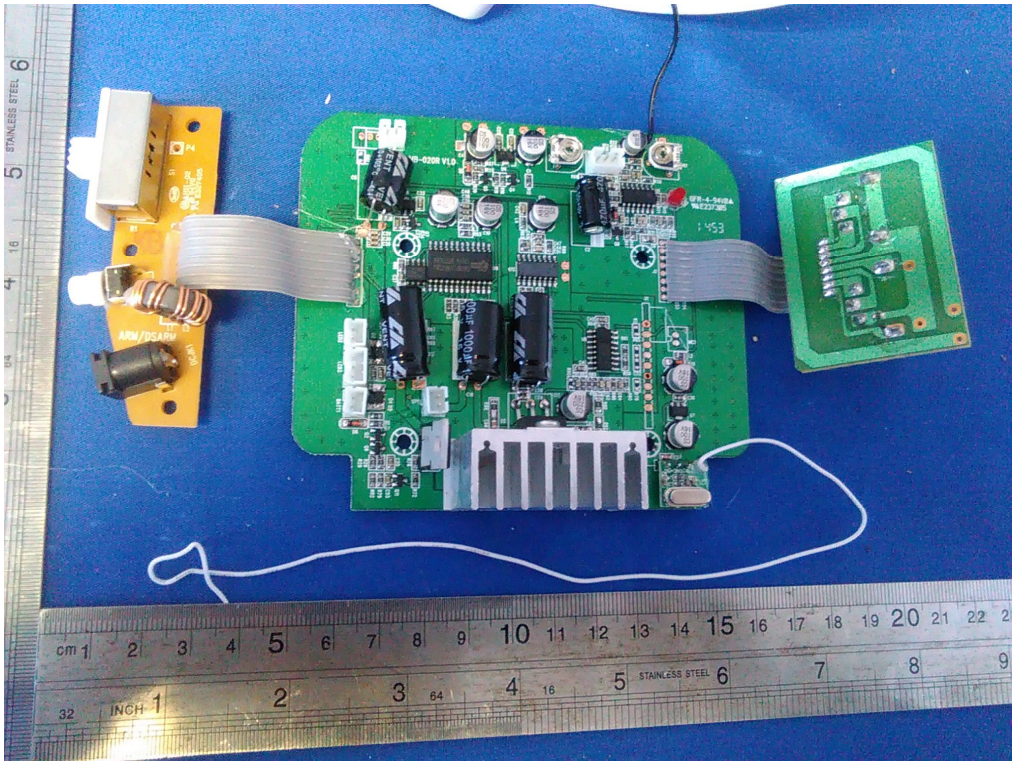


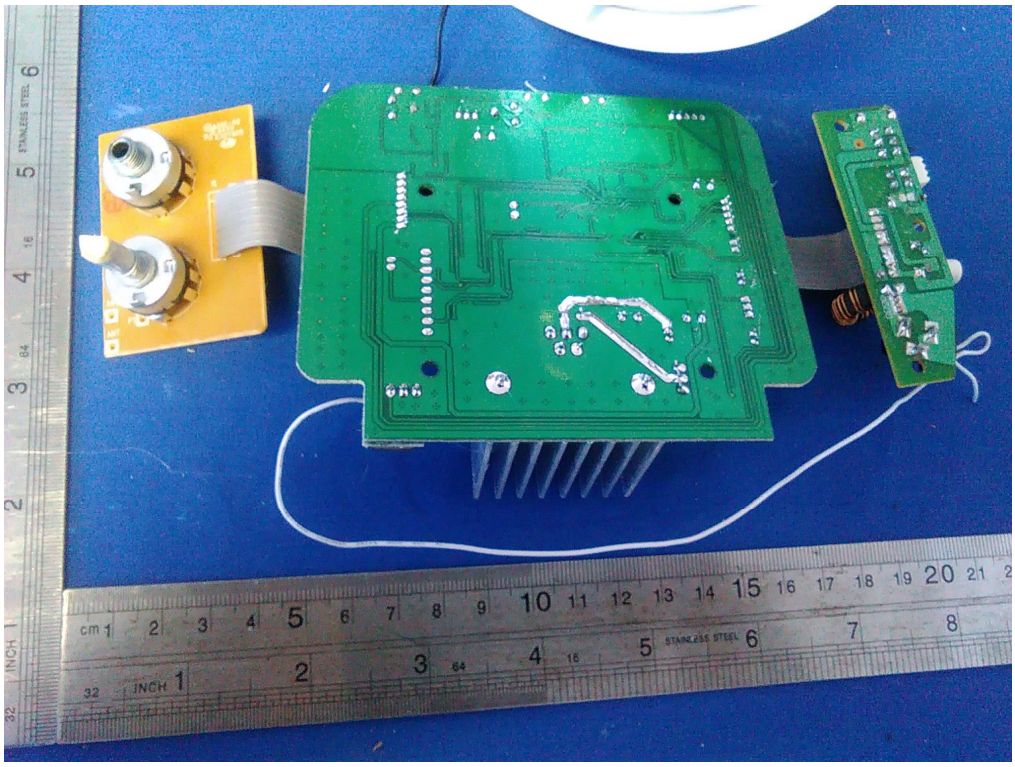
10. PHOTOGRAPHS OF THE EUT











END.