STC Test Report

Date : 2008-10-15
No. : HM162437

Applicant (SUE004): Supersonics Electric Company
Phase II, Block C, 4th Floor, Gee Chang Ind. Bldg.,
108 Lok Shan Road, Kowloon, Hong Kong.

Manufacturer: Supersonics Electronics Toys (Shenzhen) Co., Ltd.
Block 1 & 2, Xin Tian Village, Xin Feng Ind. Area,
Guan Lan, Bao An, Shenzhen, China

Description of Samples:

Product:	Wireless Drum Stick
Brand Name:	Kawasaki
Model Number:	77201A
FCC ID:	II677201A

Date Samples Received: 2008-08-26, 2008-09-19

Date Tested: 2008-09-03 to 2008-10-15

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2006 and ANSI C63.4:2003 for FCC Certification.

Conclusions: The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: For additional models details, see page 5

Dr. LEE Kam Chuen,
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

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CONTENT:

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1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

1.2 Applicant Details

Applicant

Supersonics Electric Company
Phase II, Block C, 4th Floor, Gee Chang Ind. Bldg.,
108 Lok Shan Road, Kowloon, Hong Kong.

Manufacturer

Supersonics Electronics Toys (Shenzhen) Co., Ltd.
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Guan Lan, Bao An, Shenzhen, China

1.3 Equipment Under Test [EUT]

Description of Sample

Model Name:	Wireless Drum Stick
Manufacturer:	Supersonics Electronics Toys (Shenzhen) Co., Ltd.
Brand Name:	Kawasaki
Model Number:	77201A
Additional Brand Name(s):	Disney
Additional Model Number(s):	90602
Input Voltage:	4.5Vd.c ("LR44" size battery x 3)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Supersonics Electric Company, Wireless Drum Stick. The transmitter is a 2 buttons transmitter. The EUT continues to transmit while switched on. It is pulse transmitter, Modulation by IC, and type is pulse modulation.

1.4 Date of Order

2008-08-26, 2008-09-19

1.5 Submitted Sample(s):

2 Samples

1.6 Test Duration

2008-09-03 to 2009-10-15

1.7 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2007 and ANSI C63.4:2003 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result	
				Pass	Failed
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.229	ANSI C63.4:2003	N/A	☒	☐
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	☒	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions (30 – 1000MHz)

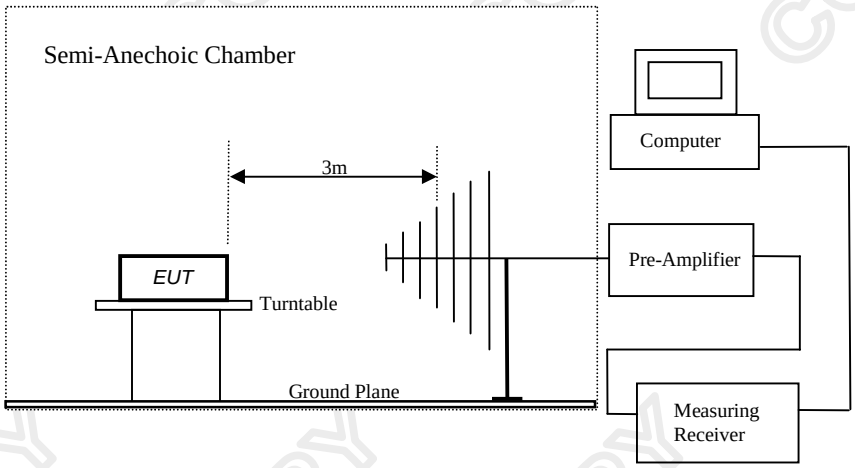
Test Requirement:	FCC 47CFR 15.229
Test Method:	ANSI C63.4:2003
Test Date:	2008-09-19
Mode of Operation:	Tx mode

Test Method:

The sample was placed 0.8m above the ground plane of Semi-Anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-Anechoic Chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:



Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.229]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [μV/m]	Field Strength of Fundamental Emission [Average] [μV/m]
40.66-40.70	10,000	1,000

Results:

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
40.69	42.6	13.1	55.7	609.5	10,000	Horizontal

Field Strength of Fundamental Emissions Average							
Frequency	Measured Level @3m dBμV	Adjusted by Duty Cycle	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
40.69	38.7	-3.86	13.1	51.8	389.0	1,000	Horizontal

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results:

Radiated Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
81.37	25.2	8.7	33.9	49.5	100	Horizontal
122.06	< 1.0	10.3	< 11.3	< 3.7	150	Horizontal
162.74	< 1.0	11.5	< 12.5	< 4.2	150	Horizontal
203.43	< 1.0	15.9	< 16.9	< 7.0	150	Horizontal
244.11	< 1.0	15.3	< 16.3	< 6.5	200	Horizontal
284.80	< 1.0	17.2	< 18.2	< 8.1	200	Horizontal
325.48	< 1.0	17.3	< 18.3	< 8.2	200	Horizontal
366.17	< 1.0	20.5	< 21.5	< 11.9	200	Horizontal
406.85	< 1.0	20.6	< 21.6	< 12.0	200	Horizontal

Remarks:
No further spurious emissions found between lowest internal frequency and 30MHz.
Correction Factor includes Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB

3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.215
Test Method:	ANSI C63.4:2003 (Section 13.1.7)
Test Date:	2008-09-13
Mode of Operation:	On mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

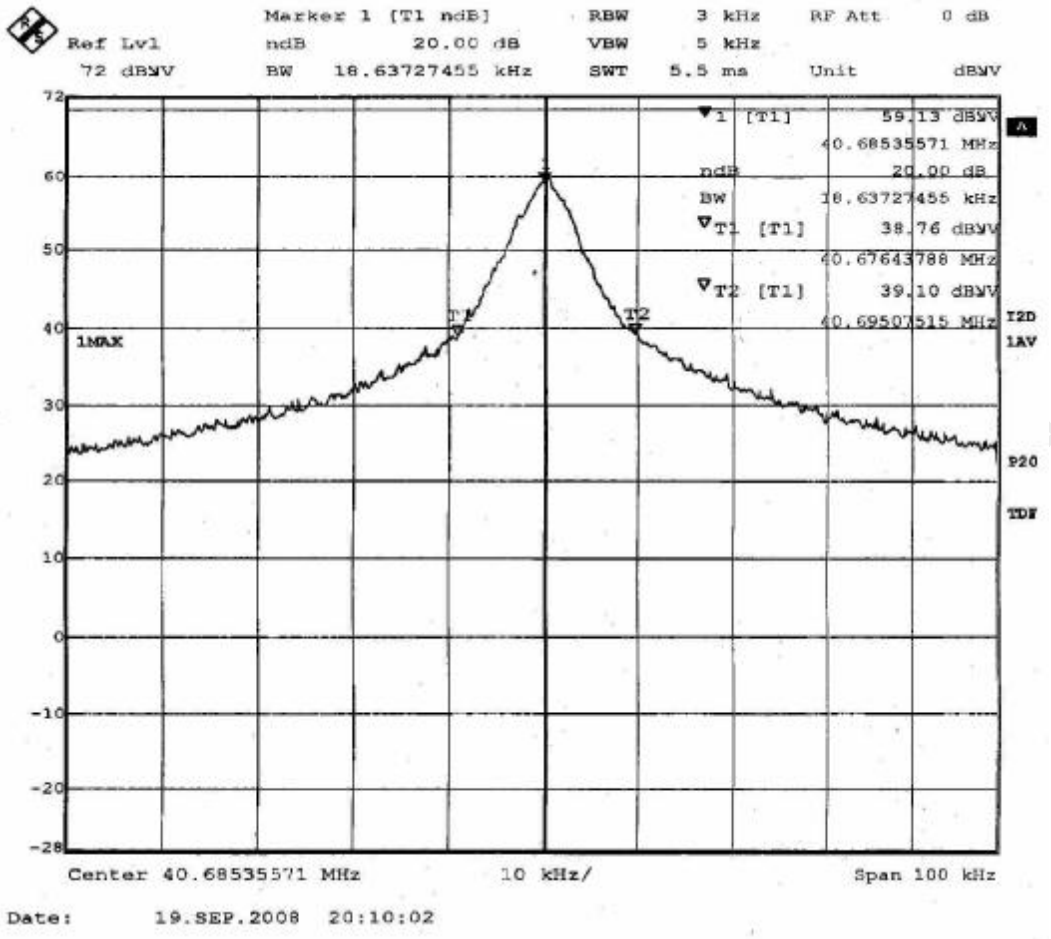
Test Setup:

As Test Setup of clause 3.1.1 in this test report.

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]	FCC Limits [MHz]
40.685	18.637	within 40.66-40.70

20dB Bandwidth of Fundamental Emission



3.3 Frequency Stability

Test Requirement:	FCC 47CFR 15.229 (d)
Test Method:	ANSI C63.4:2003 (Section 13.1.7)
Test Date:	2008-10-15
Mode of Operation:	On mode
Test Requirement:	All other R/C transmitters that transmit in the MHz frequency band must be maintained within a frequency tolerance of ±0.01% (100ppm)

Test Method:
Frequency measurements were made as follows:

(a) at 10 degree intervals of temperatures between -20ºC and +50ºC at the manufacturer's rated supply voltage, and

(b) at +20ºC temperature and ±15% supply voltage variations.
Note, for battery operated equipment, the equipment tests shall be performed using a new battery.

Test Result:

Frequency Stability Under Low Voltage Conditions

Nominal transmit frequency: 40.685MHz

TEST CONDITIONS T_{nom}: 20ºC		Measured frequency (MHz)	Frequency drift (kHz)	Frequency drift (ppm)	Frequency error Limit (kHz)
U_{nom}:	4.5V	40.68507	N/A	N/A	N/A
U_{nom}+15%	5.2V	40.68527	0.20	4.92	4.0685
U_{nom}-15%	3.8V	40.68494	-0.13	-3.20	4.0685

Frequency Stability Under Extreme Temperature

TEST CONDITIONS		Nominal Transmit Frequency: 40.685MHz			
		3dB point Frequency (MHz)	Frequency Drift (kHz)	Frequency Drift (ppm)	Frequency error Limit (kHz)
T_{max}:50ºC	U_{nom}: 4.5V	40.68507	0.00	0.00	4.0685
T:40ºC	U_{nom}: 4.5V	40.68507	0.00	0.00	4.0685
T:30ºC	U_{nom}: 4.5V	40.68507	0.00	0.00	4.0685
T_{nom}:20ºC	U_{nom}: 4.5V	40.68507	0.00	0.00	4.0685
T:10ºC	U_{nom}: 4.5V	40.68527	0.20	4.92	4.0685
T:0ºC	U_{nom}: 4.5V	40.68500	-0.07	-1.72	4.0685
T:-10ºC	U_{nom}: 4.5V	40.68487	-0.20	-4.92	4.0685
T_{min}:-20ºC	U_{nom}: 4.5V	40.68507	0.00	0.00	4.0685
Maximum Frequency error/drift			0.20	4.92	4.0685

Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM215	MULTIDEVICE CONTROLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--	2006/05/02	2009/05/02
EM174	BICONILOG ANTENNA	EMCO	3142C	00029071	2008/01/24	2009/01/24
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2006/07/26	2009/07/26

Remarks:-
CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

Appendix B

Duty Cycle Correction During 100msec

Each function key sends a different series of characters, but each packet period (17.635msec) never exceeds a series of 4 long (1.523msec) and 10 short (0.521msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered (4x1.523)+(10x0.521) per 17.635msec=64.09% duty cycle. Figure A through B show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log(0.6409) =-3.86dB

The following figures [Figure A to Figure C] show the characteristics of the pulse train for one of these functions.

Figure A [Pulse Train]

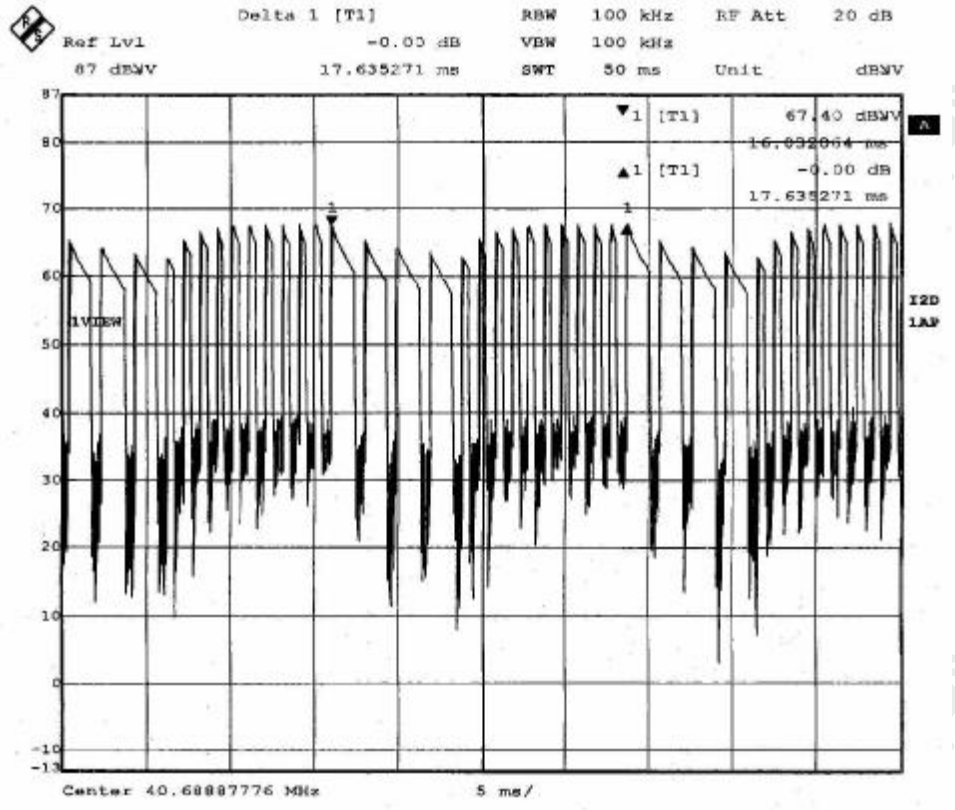


Figure B [Long Pulse]

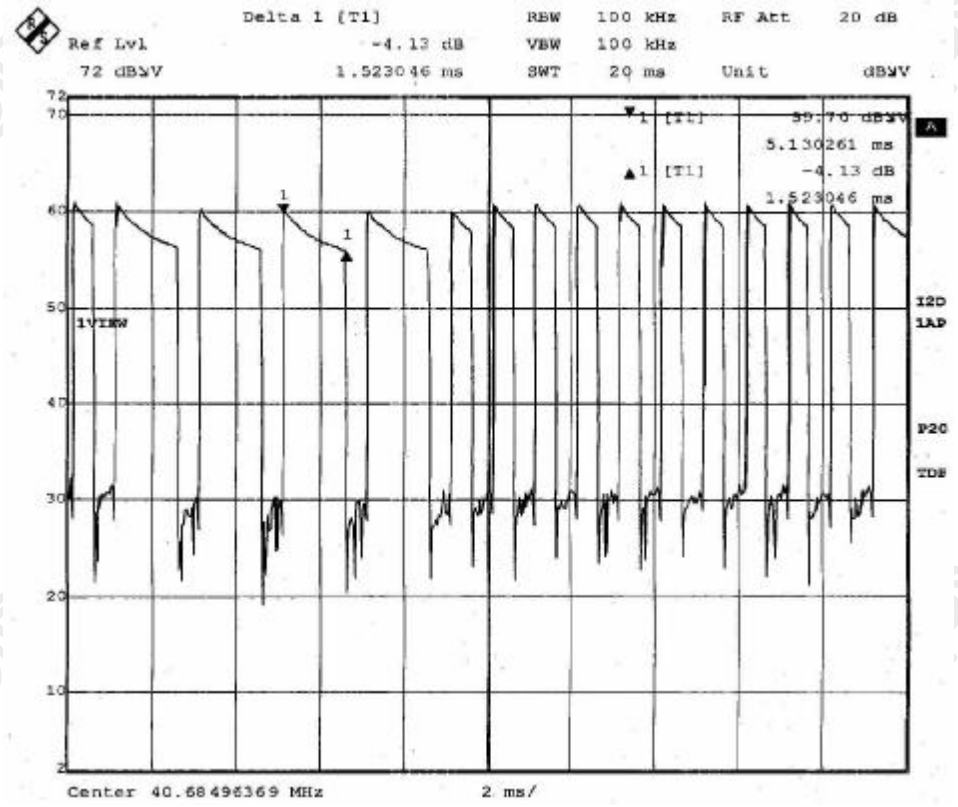
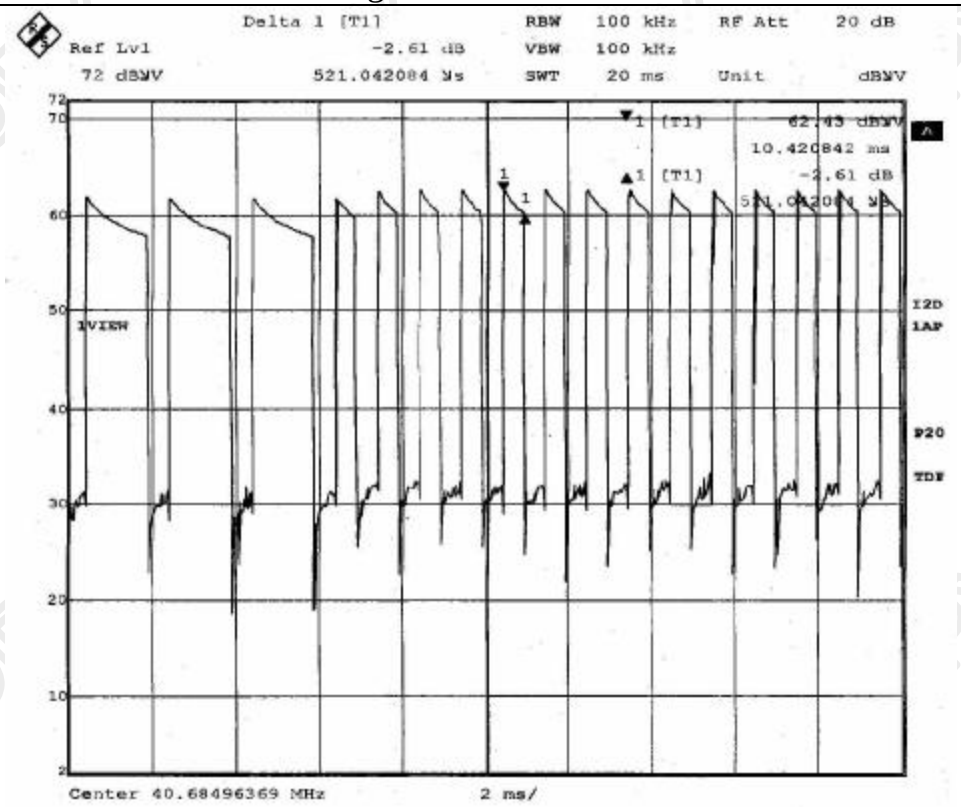


Figure B [Short Pulse]



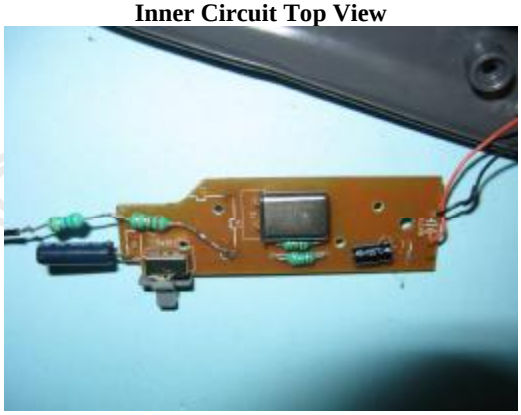
Appendix C

Photographs of EUT

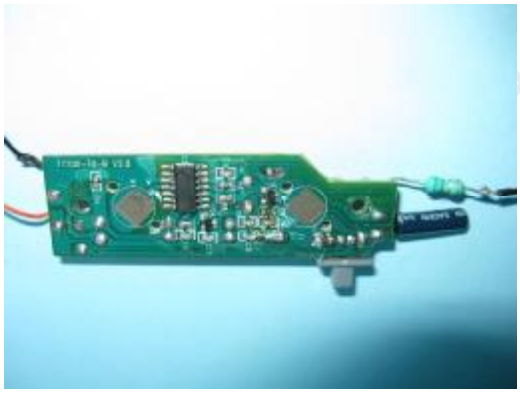
Front View of the product

Rear View of the product

Inner Circuit Top View



Inner Circuit Bottom View



Photographs of EUT

Measurement of Radiated Emission Test Set Up

******* End of Test Report *******