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Report No.: GZEM131100533201

Page: 1 of 17

FCC ID: 2AB8VEF18

TEST REPORT

Application No.:	GZEM1311005332ME
Applicant:	Esther Michele Ltd
FCC ID:	2AB8VEF18
Product Name:	LedSonic
Product Description:	LEDs & Ultrasonic Device
Model No.:	QM-EF18
Trade Mark:	ESTHER MICHELE
Standards:	FCC CFR 47 PART 18: 2013
Date of Receipt:	2013-11-14
Date of Test:	2013-11-27
Date of Issue:	2014-06-10
Test Result :	Pass*

* In the configuration tested, the EUT complied with the standards specified above.



Authorized Signature

Richard Li
Manager

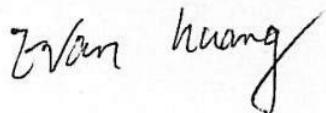
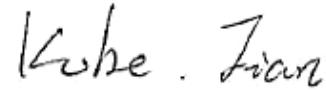
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2014-06-10		Original

Authorized for issue by:			
Tested By	 (Evan Huang) / Project Engineer		2013-11-27
Prepared By	 (June Chen) / Clerk		2014-06-10
Checked By	 (Kobe Jian) / Reviewer		2014-06-10

3 Test Summary

Electromagnetic Interference (EMI)				
Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (9 kHz to 30 MHz)	FCC CFR 47 PART 18: 2013	FCC OST/ MP-5:1986	18.305(b)	PASS
Radiated Emission (30 MHz to 1 GHz)	FCC CFR 47 PART 18: 2013	FCC OST/ MP-5:1986	18.305(b)	PASS
Remark : EUT: In this whole report EUT means Equipment Under Test. N/A: Not applicable. Please refer to section 7.2 for further details.				

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5 General Information

5.1 Client Information

Applicant: Esther Michele Ltd
Address of Applicant: RM, 2309, HongMan Ind, Center, No. 2, HongMan Street, Chaiwan, Hongkong

5.2 General Description of E.U.T.

Product Name: LedSonic
Product Description: LEDs & Ultrasonic Device
Model No.: QM-EF18

5.3 Details of E.U.T.

Rated Supply (Voltage): Supplied by Lithium battery: 11,1 V
Charged by AC/DC adapter
AC/DC adaptor details: Model: S08-006-0120-00400
Input: 100-240 V, 50/60 Hz, 0,2 A;
output: 12 Vd.c., 400 mA
Power Cable: 1.0 m x 2 wires unscreened DC output cable from AC/DC adapter

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Deviation from Standards

None.

5.6 General Test Climate During Testing

Temperature: 15-30 °C Humidity: 30~70 %RH Atmospheric Pressure: 860-1060 mbar

5.7 Abnormalities from Standard Conditions

None.

5.8 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663
Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

5.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC (Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **Industry Canada (Registration No.: 4620B-1)**

The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

- **VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460, C-2584, G-449 and T-1179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01:2006-10 and Rules of procedure IECEE 02:2006-10, and the relevant IECEE CB-Scheme Operational documents.

6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)	Calibration Interval
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2014-08-30	2Y
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2014-05-06	1Y
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2015-03-03	1Y
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2014-05-09	1Y
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2016-08-31	3Y
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2016-08-31	3Y
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2014-06-02	2Y
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2016-08-31	3Y
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2014-07-01	2Y
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2015-03-03	1Y
EMC2065	Amplifier	HP	8447F	N/A	2014-08-31	1Y
EMC2063	1-26GHz Pre Amplifier	Compliance Direction System Inc.	PAP-1G26-48	6279.628	2014-07-29	1Y
EMC0075	310N Amplifier	Sonama	310N	272683	2015-03-03	1Y
EMC0523	Active Loop Antenna	EMCO	6502	42963	2014-04-07	2Y
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONI	BBHA 9170	9170-375	2014-06-01	3Y
EMC2069	2.4GHz filter	Micro-Tronics	BRM 50702	149	2014-06-05	1Y
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-04-27	2Y
EMC2041	Broad-Band Horn Antenna(14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9170	9170-375	2014-06-11	3Y

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)	Calibration Interval
EMC0006	DMM	Fluke	73	70681569	2014-09-13	1Y
EMC0007	DMM	Fluke	73	70671122	2014-09-13	1Y

7 Emission Test Results

7.1 Radiated Emissions, 9 kHz to 30 MHz

Test Requirement: FCC Part 18
Test Method: FCC OST/ MP-5
Power Supply: DC 12V
Test Date: 2013-12-27
Frequency Range: 9KHz to 30MHz
Measurement Distance: 10 m
Detector: Peak for pre-scan, Average for the final result
(200 Hz Resolution Bandwidth for 9 kHz to 150 kHz
9 kHz Resolution Bandwidth for 150 kHz to 30 MHz)

Limit:

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)
Ultrasonic	Below 490 kHz	Below 500	2,400/F(kHz)
	490 to 1,600 kHz	500 or more	2,400/F(kHz) \times SQRT(power/500).
	Above 1,600 kHz	Any	24,000/F(kHz)
		Any	15

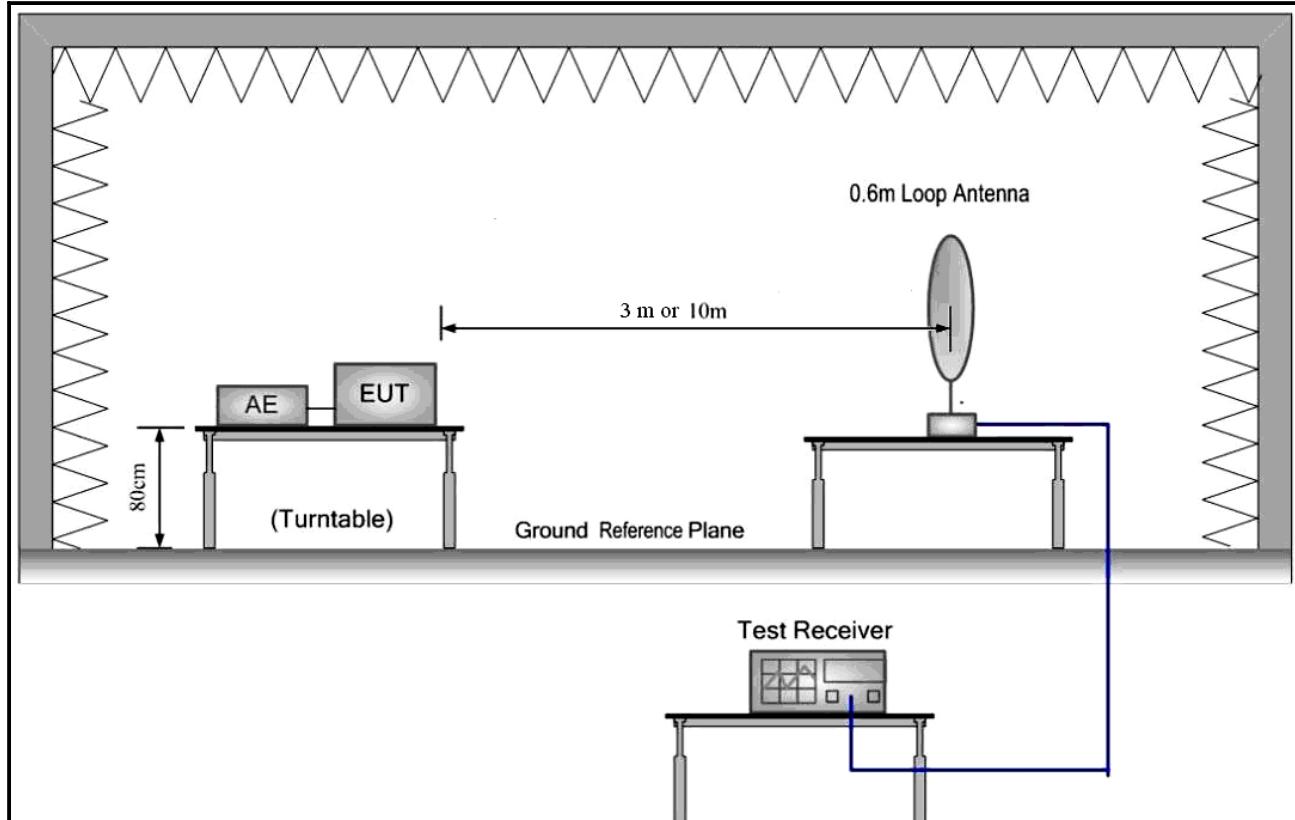
For any ultrasonic equipment which operating frequency between 490 to 1,600 KHz, the field strength limit is $24,000/F(KHz)$ μ V/m@30m, i.e. **78.06dB μ V/m at 9KHz & 7.60dB μ V/m at 30MHz @10m distance.**

For any ultrasonic equipment which operating frequency above 1,600 KHz, the field strength limit is 15 μ V/m@30m, i.e. **33.06dB μ V/m @10m distance.**

7.1.1 E.U.T. Operation

EUT Operation: Test the EUT in ultrasonic mode with 5MHz output and 1MHz output.

7.1.2 Test Setup and Procedure



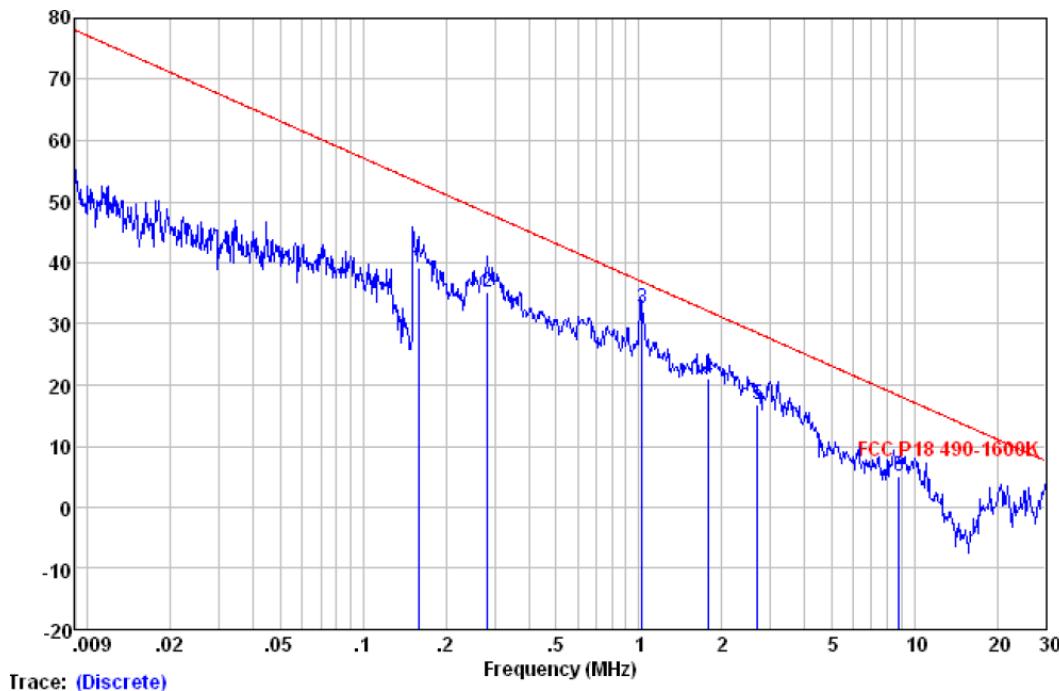
1. The magnetic emissions test was conducted in a semi-anechoic chamber.
2. The EUT was connected to AC power source through a mains power outlet which was bonded to the ground reference plane; The mains cables shall drape to the ground reference plane.
3. The tabletop EUT was placed upon a non-metallic table 1 m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of magnetic emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum signature data plots of the EUT.

The frequencies of maximum emission were determined in the final magnetic emissions measurement. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360°, the antenna was supported in the vertical plane and be rotatable about a vertical axis. The antenna height was set at around 2 m above the ground reference plane.

7.1.3 Measurement Data

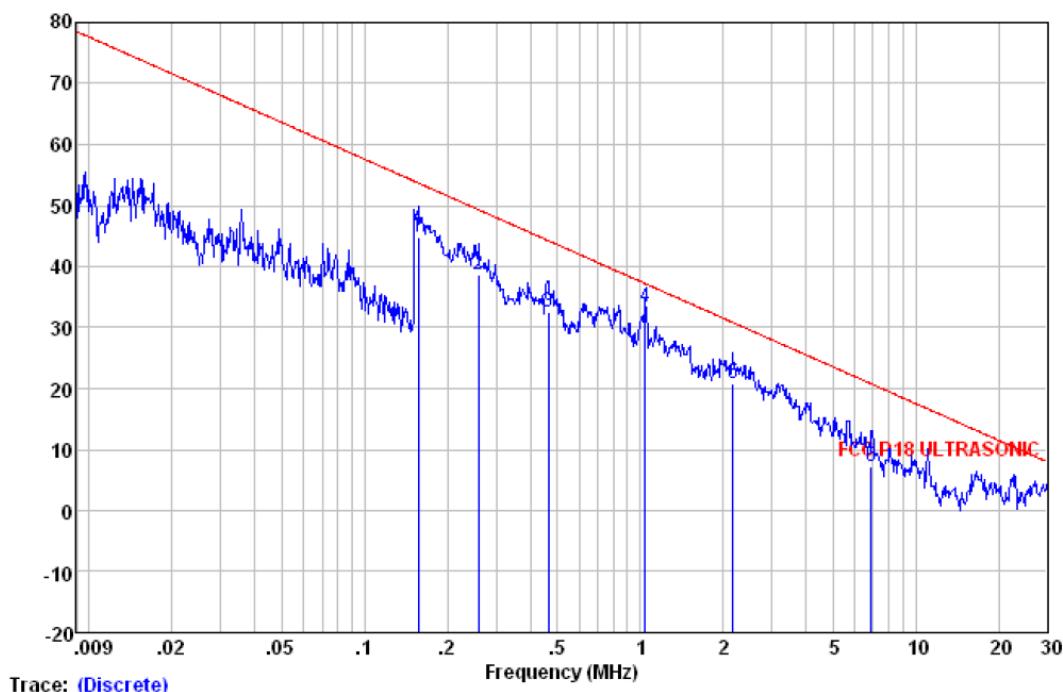
1MHz**Vertical:**

Peak scan

Level (dB μ V/m)**Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.**

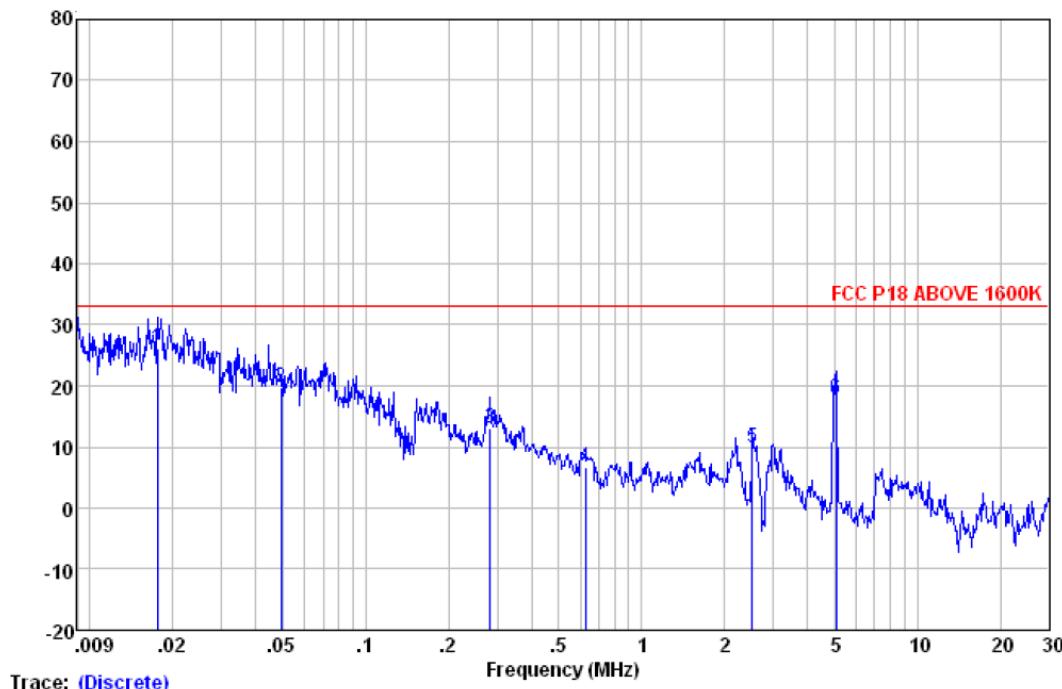
1MHz**Horizontal:**

Peak scan

Level (dB μ V/m)**Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.**

5MHz**Vertical:**

Peak scan

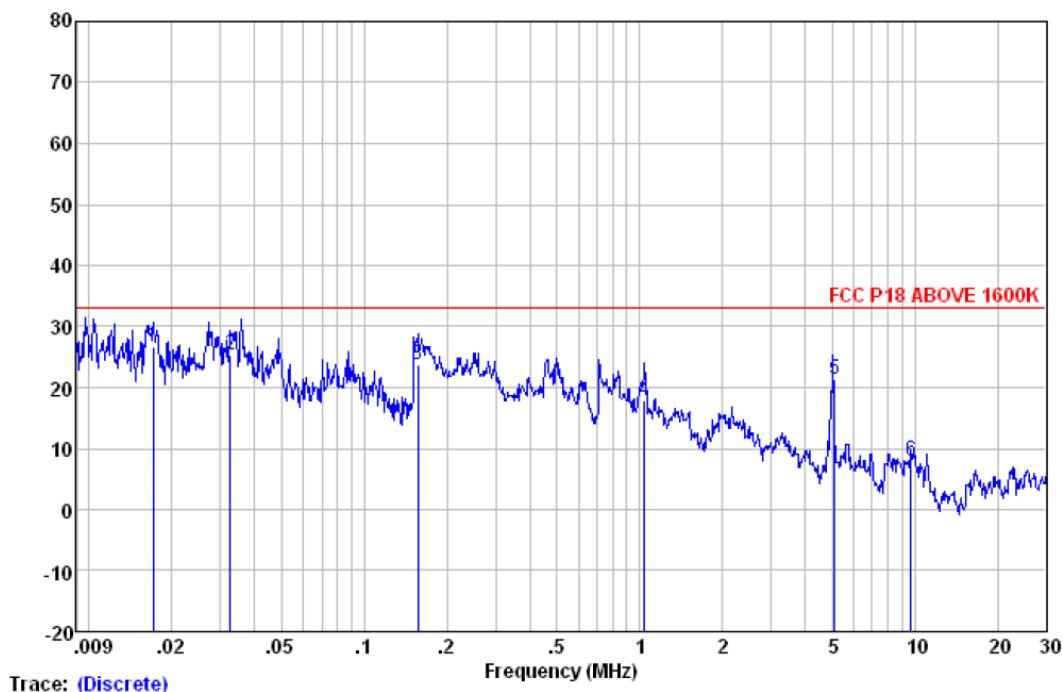
Level (dB μ V/m)**Average measurement**

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Factor			
MHz	dB μ V	dB/m	dB	dB	dB μ V/m	dB μ V/m	dB
0.018	39.72	18.34	0.00	31.89	26.17	33.06	-6.89 Average
0.049	37.94	13.52	0.00	31.82	19.64	33.06	-13.42 Average
0.283	31.41	13.40	0.08	31.78	13.11	33.06	-19.95 Average
0.626	24.93	13.46	0.05	31.75	6.69	33.06	-26.37 Average
2.527	28.26	13.11	0.10	31.63	9.84	33.06	-23.22 Average
5.067	37.58	11.70	0.17	31.61	17.84	33.06	-15.22 Average

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

5MHz**Horizontal:**

Peak scan

Level (dB μ V/m)

Average measurement

Freq	Read		Antenna		Cable		Preamp		Limit	Over	Remark
	Level	Factor	Loss	Factor	Level	dBuV/m	dBuV/m	dB			
MHz	dB μ V	dB/m									
0.017	40.01	18.46	0.00	31.89	26.58	33.06	-6.48	Average			
0.033	41.93	15.19	0.00	31.84	25.28	33.06	-7.78	Average			
0.156	41.88	13.59	0.07	31.79	23.75	33.06	-9.31	Average			
1.044	36.06	13.59	0.02	31.69	17.98	33.06	-15.08	Average			
5.104	41.00	11.69	0.17	31.61	21.25	33.06	-11.81	Average			
9.715	27.97	11.41	0.16	31.60	7.94	33.06	-25.12	Average			

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

7.2 Radiated Emissions, 30 MHz to 400 MHz

Test Requirement: FCC Part 18
Test Method: FCC OST/ MP-5
Power Supply: DC 12V
Test Date: 2013-12-27
Frequency Range: 30MHz to 1GHz
Measurement Distance: 10 m
Detector: Peak for pre-scan, Average for the final result
(120 kHz Resolution Bandwidth for 30 MHz to 1 GHz)

Limit:

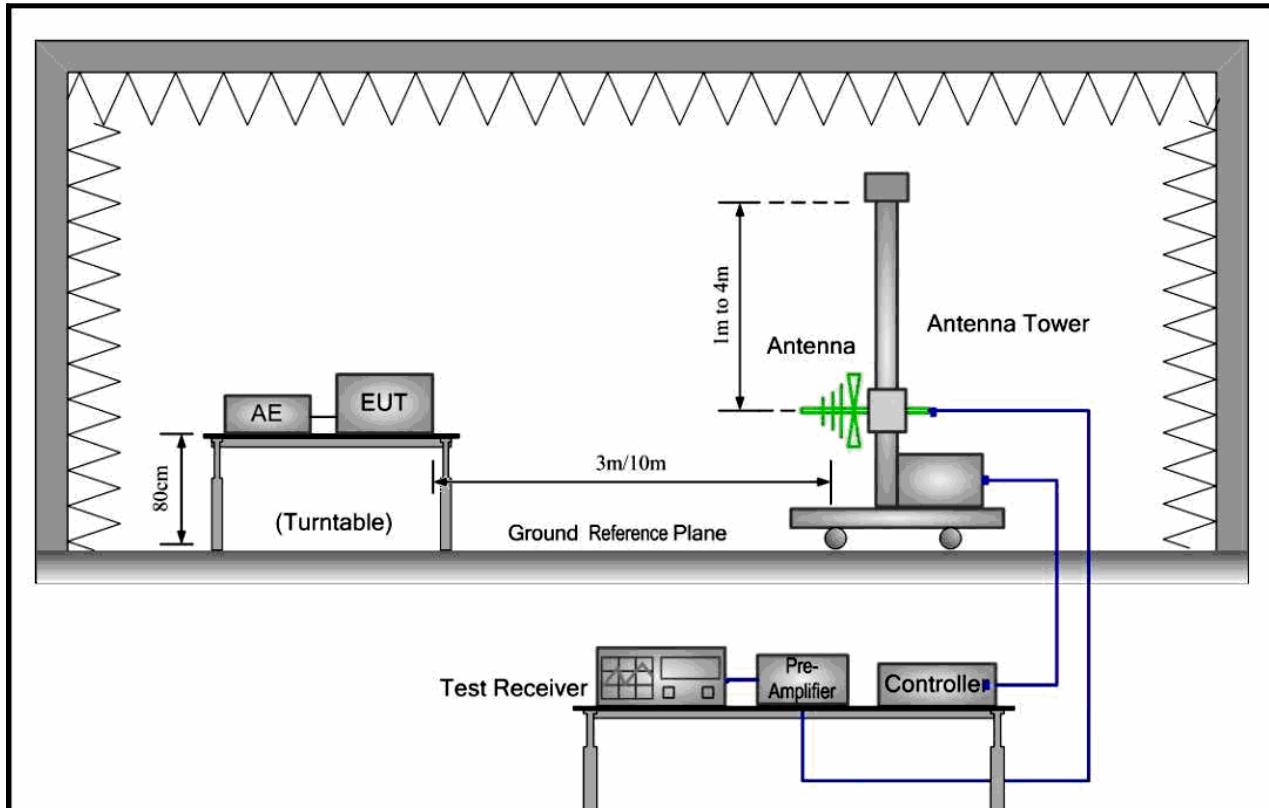
Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)
Ultrasonic	Above 1,600 kHz	Any	15

For any ultrasonic equipment which operating frequency above 1,600 KHz, the field strength limit is 15 μ V/m@30m, i.e. **33.06dB μ V/m @10m distance**.

7.2.1 E.U.T. Operation

EUT Operation: Test the EUT in ultrasonic mode with 5MHz output.

7.2.2 Test Setup and Procedure



5. The radiated emissions test was conducted in a semi-anechoic chamber.
6. Biconical and log periodic antenna was used for the frequency range from 30MHz to 400MHz
7. The EUT was connected to nominal power supply through a mains power outlet which was bonded to the ground reference plane; The mains cables were draped to the ground reference plane. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
8. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.

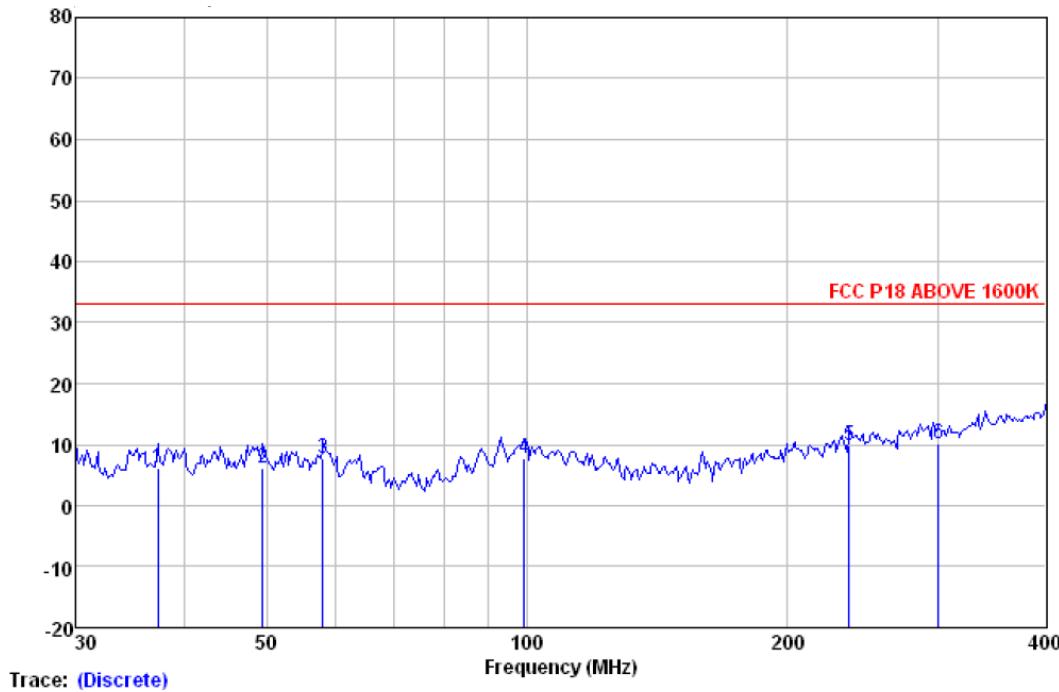
The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

7.2.3 Measurement Data

Vertical:

Peak scan

Level (dB μ V/m)

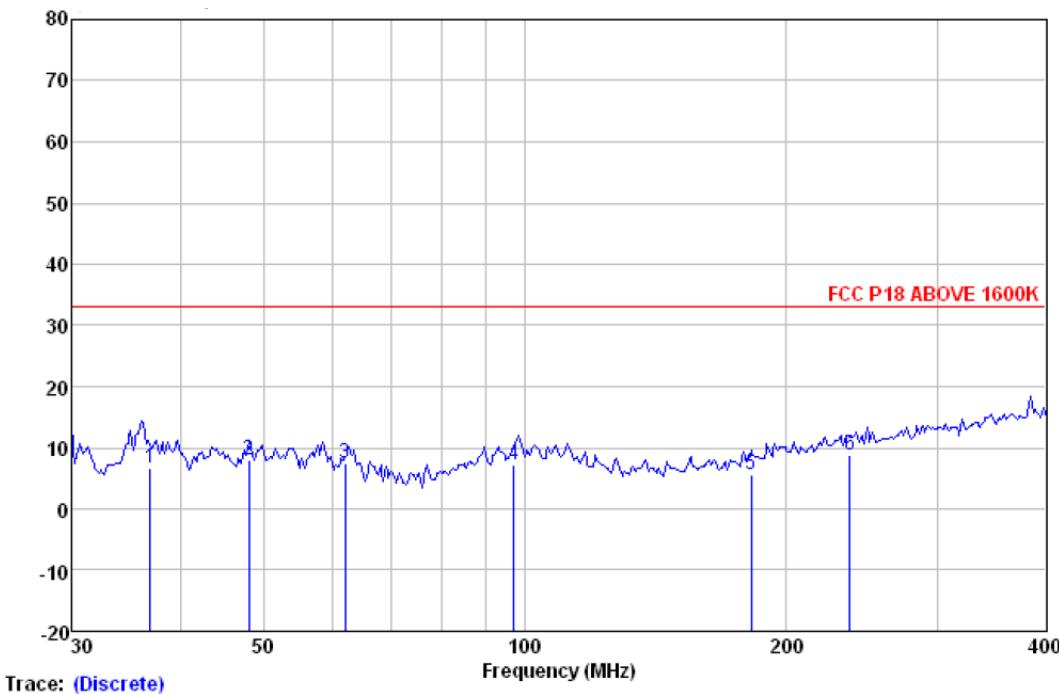


Freq MHz	Read Level dB μ V	Antenna Factor dB/m	Cable Loss dB	Preamp Factor dB	Line Level dB μ V/m	Limit Line dB μ V/m	Over Limit dB	Over Limit Remark
37.285	17.63	19.10	0.91	31.60	6.04	33.06	-27.02	Average
49.359	18.68	18.18	1.00	31.60	6.26	33.06	-26.80	Average
57.999	23.11	15.10	1.10	31.60	7.71	33.06	-25.35	Average
99.180	24.36	13.68	1.42	31.60	7.86	33.06	-25.20	Average
236.645	27.61	11.53	2.08	31.30	9.92	33.06	-23.14	Average
300.367	27.11	11.90	2.35	31.30	10.06	33.06	-23.00	Average

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

Horizontal:

Peak scan

Level (dB μ V/m)

Average measurement

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Factor			
MHz	dB μ V	dB/m	dB	dB	dB μ V/m	dB μ V/m	dB
36.895	23.17	11.97	0.90	29.50	6.54	33.06	-26.52 Average
47.994	24.04	12.50	0.99	29.50	8.03	33.06	-25.03 Average
61.995	24.82	11.04	1.14	29.56	7.44	33.06	-25.62 Average
97.115	23.33	12.11	1.40	29.69	7.15	33.06	-25.91 Average
182.559	23.64	9.64	1.83	29.56	5.55	33.06	-27.51 Average
237.476	24.32	11.98	2.09	29.54	8.85	33.06	-24.21 Average

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.**--End of Report--**