SGS-CSTC Standards Technical Services Co., Ltd.

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TEST REPORT

Application No.:	GZEM1206002301RF
Applicant:	Hankey Toys
FCC ID:	OMX18029534835
Product Name:	R/C plane
Product Description:	Radio toys with 49.860 MHz as a carrier
Model No:	501, 502, 503, 504, 505, 506, 507, 508, 509, 301, 303, 305, 701, 702, 703, 704, 705, 706, 707, 708, 709, 901, 902, 903, 904, 905, 906, 907, 908, 909 ♣
♣	Please refer to section 3 of this report which indicates which Model was actually tested and which were electrically identical.
Standards:	47 CFR Part 15, Subpart B:2011
Date of Receipt:	2012-06-20
Date of Test:	2012-06-26 to 2012-07-05
Date of Issue:	2012-07-19
Test Result :	**Pass***

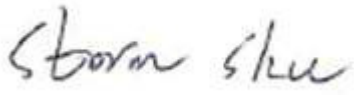
* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Strong Yao
Manager

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2012-07-19		Original

Authorized for issue by:				
Tested By		 **(Storm Shu)/Project Engineer**		2012-06-26 to 2012-07-05 **Date**
Prepared By		 **(Millie Li) /Clerk**		2012-07-13 **Date**
Checked By		 **(Strong Yao)/Reviewer**		2012-07-19 **Date**

3 Test Summary

Electromagnetic Interference (EMI)				
Test	**Test Requirement**	**Test Method**	**Class / Severity**	**Result**
Conducted Emission (150 KHz to 30 MHz)	FCC PART 15 SUBPART B	ANSI C63.4	Class B	PASS **
Radiated Emission (30 MHz to 1 GHz)	FCC PART 15 SUBPART B	ANSI C63.4	Class B	PASS
Radiated Emission above 1 GHz	FCC PART 15 SUBPART B	ANSI C63.4	Class B	N/A

Remark :

N/A: Not applicable. Please refer to clause 7.3 for details.

EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

ANSI C63.4: the detail version is ANSI C63.4:2009 in the whole report.

** The EUT passed Conducted Emission after retest.

♣ Model No.: 501, 502, 503, 504, **505,** 506, 507, 508, 509, 301, 303, 305, 701, 702, 703, 704, 705, 706, 707, 708, 709, 901, 902, 903, 904, 905, 906, 907, 908, 909

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference being the Model No. and appearance.

Therefore only one model **505** was tested in this report.

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5 General Information

5.1 Client Information

Applicant:	Hankey Toys
Address of Applicant:	Guanshan Industrial Park Chenghai District Shantou City, Guangdong Province China

5.2 General Description of E.U.T.

Product Name:	R/C plane
Model No:	505

5.3 Details of E.U.T.

Power Supply:	DC 3.7V internal rechargeable battery
Adapter:	Model No.:A800-37 PRI: AC 110-240V 50Hz SEC: 3.7V-800mA S&S ELECT.CO., LTD
Power cord:	N/A

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

The EUT passed Conducted Emission after retest.

5.7 General Test Climate During Testing

Temperature: 15-30 °C Humidity: 30~70 %RH Atmospheric Pressure: 886~1086 mbar

5.8 Other Information Requested by the Customer

None.

5.9 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.

5.10 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.

  Date of Registration: February 18, 2009.Valid until February 18, 2011.

- **VCCI (Registration No.: R-2460 and C-2584)**

  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 and C-2584 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.

  This certificate was issued August 6, 2009 and valid until May 19, 2012.

6 Equipment Used during Test

Conducted Emission						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)	Calibration Interval
EMC0306	Shielding Room	Zhong Yu	8 x 3 x 3.8 m^3	N/A	N/A	N/A
EMC0118	Two-line v-netwok	R&S	ENV216	100359	2012-08-29	1Y
EMC0102	LISN	SCHAFFNER CHASE	MN2050D/1	1421	2012-11-23	1Y
EMC2046	Artificial Mains Network (LISN)	AFJ Instruments	LT32C	S.N.32031120150	2013-03-12	1Y
EMC0506	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	2012-11-24	1Y
EMC0107	Coaxial Cable	SGS	2m	N/A	2013-07-10	1Y
EMC0106	Voltage Probe	SGS	N/A	N/A	N/A	1Y
EMC0120	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	20550	2012-11-11	1Y
EMC0121	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	20549	2012-11-11	1Y
EMC0122	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	20548	2012-11-11	1Y
EMC2047	CDN	Elektronik-Feinmechanik	L-801:AF2	2793	2014-11-11	3Y
EMC2048	CDN	Elektronik-Feinmechanik	L-801:M2/M3	2738	2014-11-11	3Y
EMC167	Conical metal housing	SGS-EMC	N/A	N/A	2013-02-16	1Y

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)	Calibration
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2012-09-06	2Y
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2012-11-11	1Y
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	2013-03-12	1Y
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2013-06-01	1Y
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2012-10-20	1Y
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2012-11-28	1Y
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2012-11-28	1Y
EMC2026	Horn Antenna 1-18GHz	R&S	BBHA 9120D	9120D-841	2012-10-20	1Y
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2012-08-29	1Y
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2012-08-29	1Y
EMC0049	Amplifier	Agilent	8447D	2944A10862	2013-03-12	1Y
EMC0075	310N Amplifier	Sonama	310N	272683	2012-08-29	1Y
EMC0523	Active Loop Antenna	EMCO	6502	42963	2012-11-17	1Y
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONI	BBHA 9170	9170-375	2014-06-01	3Y
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-04-27	2Y

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)	Calibration Interval
EMC0006	DMM	Fluke	73	70681569	2012-11-14	1Y
EMC0007	DMM	Fluke	73	70671122	2012-11-14	1Y

7 Emission Test Results

Frequency range of radiated emission measurements for unintentional radiators:

Except as otherwise indicated in FCC part 15 Section 15.33 paragraphs (b)(2) or (b)(3), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency range of measurement
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

7.1 Conducted Emissions Mains Terminals, 150 KHz to 30MHz

Test Requirement: FCC Part15 B

Test Method: ANSI C63.4

Test Voltage: DC 3.7V

Frequency Range: 150KHz to 30MHz

Detector: Peak for pre-scan

Quasi-Peak and Average at frequency with maximum peak (9 kHz resolution bandwidth)

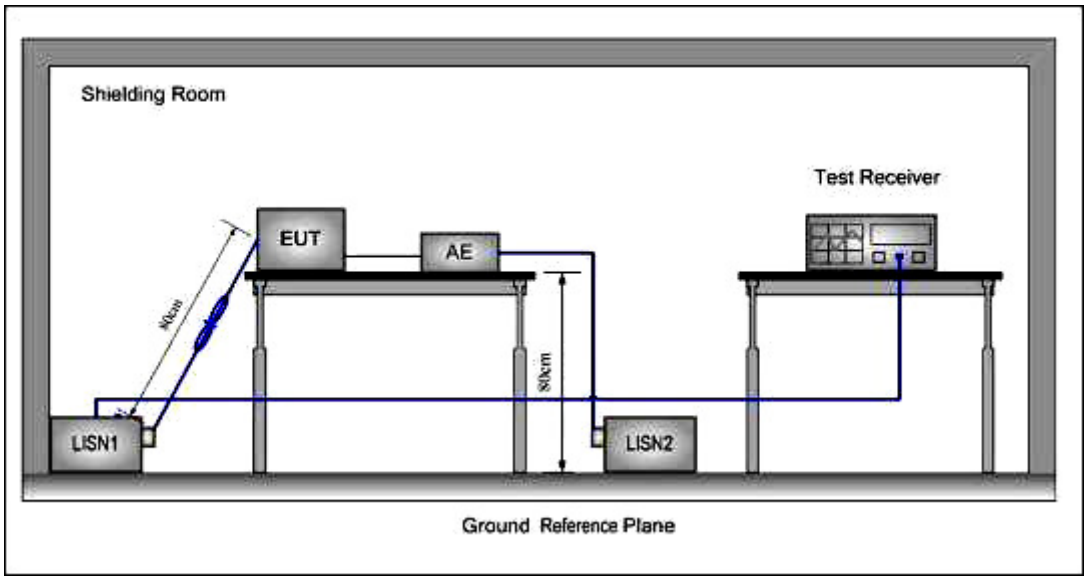
Class / Limit: Class B

Frequency range MHz	Class B Limits dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
NOTE 1 :The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. NOTE 2: The lower limit is applicable at the transition frequency.		

7.1.1 E.U.T. Operation

EUT Operation: Test the EUT in charging mode.

7.1.2 Test Setup and Procedure



1. The mains terminal disturbance voltage test was conducted in a shielded room.
2. The EUT was connected to nominal power supply through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. 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.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

7.1.3 Measurement Data

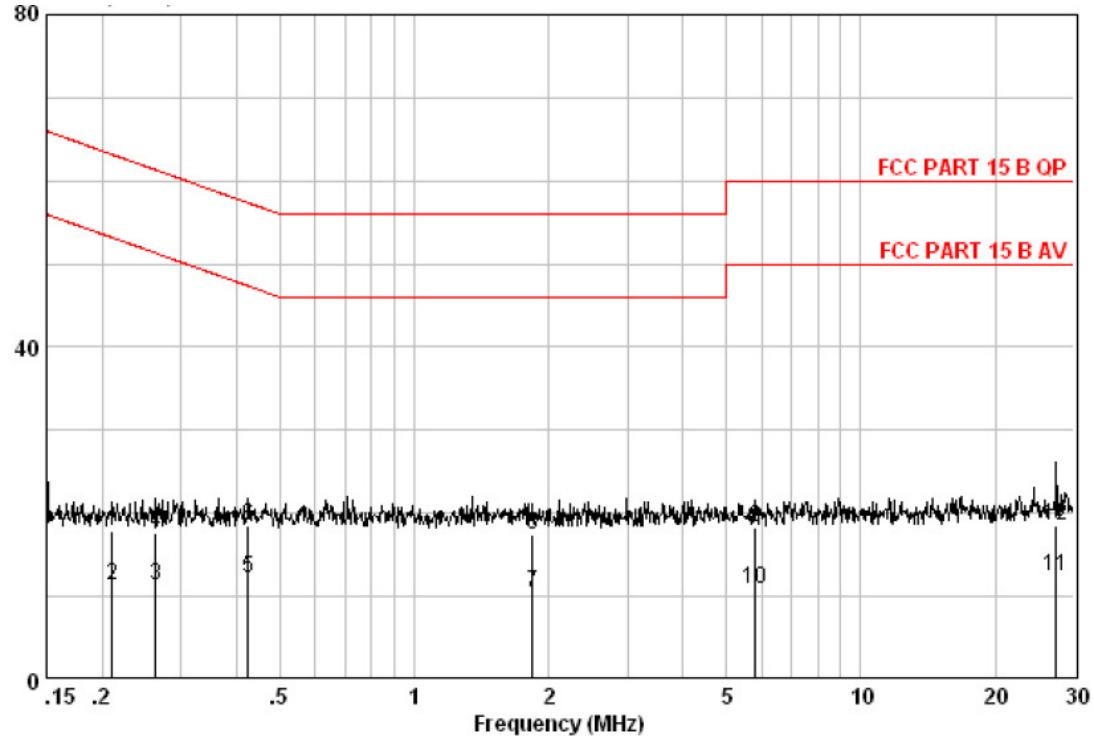
Pre-scan was performed with peak detected on both live and neutral cable. Quasi-peak & average measurements were performed at the frequencies which maximum peak emission level was detected.

Please see the attached Quasi-peak and Average test results.

Live Line:

Peak Scan:

Level (dBµV)



Quasi-peak and Average measurement

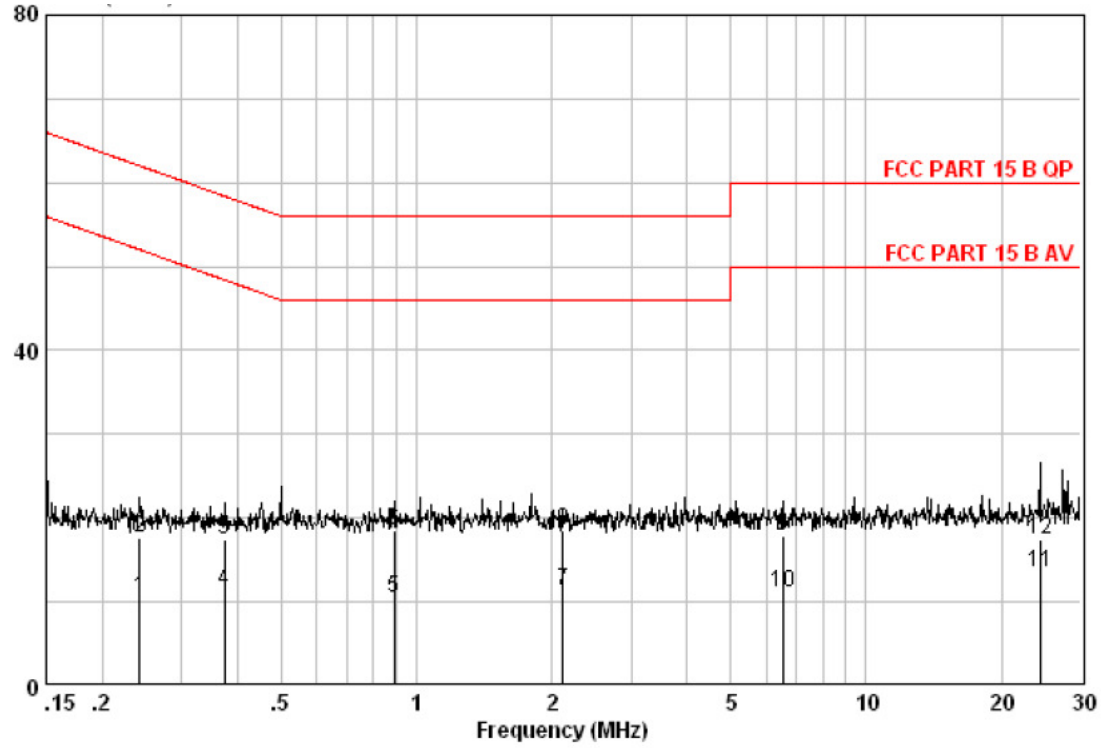
Freq	Read Level	Cable Loss	LISN Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.211	8.10	0.12	9.62	17.85	63.18	-45.34	QP
0.211	1.68	0.12	9.62	11.43	55.34	-43.91	AVERAGE
0.263	1.69	0.10	9.63	11.42	52.94	-41.52	AVERAGE
0.263	7.89	0.10	9.63	17.62	61.34	-43.72	QP
0.424	2.60	0.04	9.63	12.27	47.79	-35.51	AVERAGE
0.424	8.79	0.04	9.63	18.46	57.37	-38.91	QP
1.839	0.69	0.06	9.64	10.39	46.00	-35.61	AVERAGE
1.839	7.81	0.06	9.64	17.51	56.00	-38.49	QP
5.805	8.29	0.16	9.77	18.22	60.00	-41.78	QP
5.805	0.98	0.16	9.77	10.91	50.00	-39.09	AVERAGE
27.416	1.46	0.36	10.62	12.44	50.00	-37.56	AVERAGE
27.416	7.56	0.36	10.62	18.54	60.00	-41.46	QP

Level = Read Level + LISN Factor + Cable Loss.

Neutral Line:

Peak Scan:

Level (dBµV)



Quasi-peak and Average measurement:

Freq	Read Level	Cable Loss	LISN Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.242	0.70	0.11	9.64	10.45	53.85	-43.41	AVERAGE
0.242	7.94	0.11	9.64	17.69	62.04	-44.35	QP
0.373	7.72	0.05	9.63	17.40	58.43	-41.03	QP
0.373	1.66	0.05	9.63	11.34	49.16	-37.82	AVERAGE
0.890	0.62	0.05	9.69	10.36	46.00	-35.64	AVERAGE
0.890	8.79	0.05	9.69	18.53	56.00	-37.47	QP
2.121	1.67	0.07	9.70	11.44	46.00	-34.56	AVERAGE
2.121	8.79	0.07	9.70	18.56	56.00	-37.44	QP
6.523	7.99	0.15	9.82	17.96	60.00	-42.04	QP
6.523	1.15	0.15	9.82	11.12	50.00	-38.88	AVERAGE
24.400	2.50	0.33	10.60	13.42	50.00	-36.58	AVERAGE
24.400	6.56	0.33	10.60	17.48	60.00	-42.52	QP

Level = Read Level + LISN Factor + Cable Loss.

7.2 Radiated Emissions, 30 MHz to 1 GHz

Test Requirement: FCC Part15 B

Test Method: ANSI C63.4

Test Voltage: DC 3.7V

Frequency Range: 30MHz to 1GHz

Measurement Distance: 3 m

Detector: Peak for pre-scan

Quasi-Peak if maximised peak within 6dB of limit
(120 kHz resolution bandwidth)

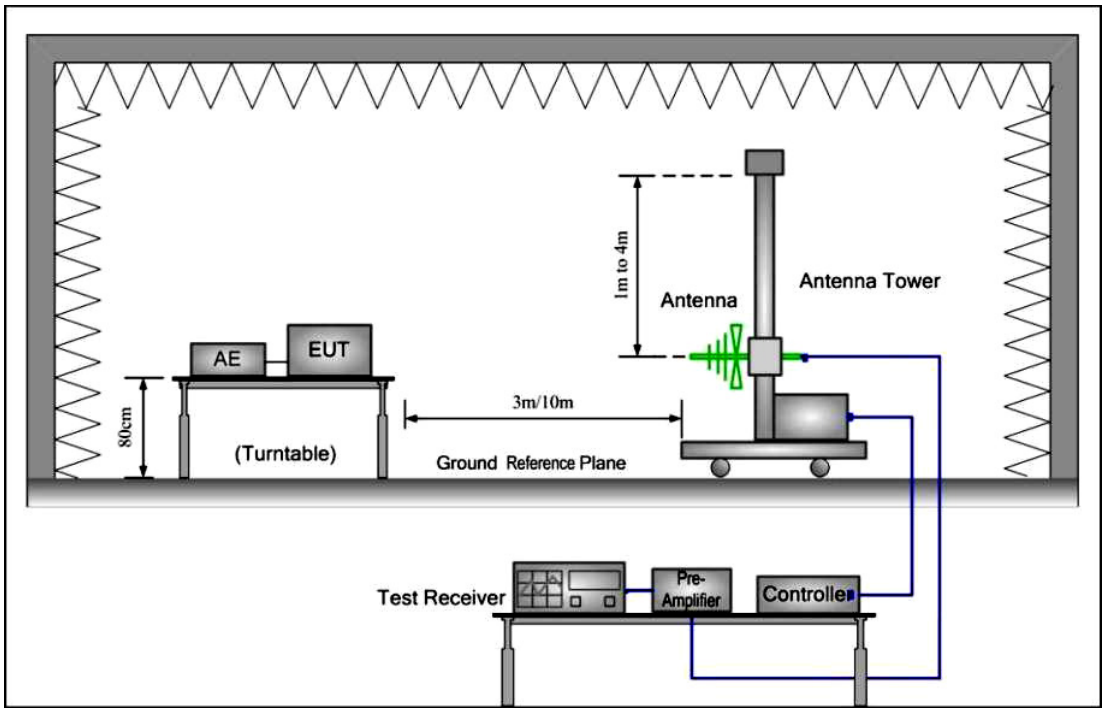
Class / Limit: Class B

Frequency range MHz	**Quasi-peak limits** dB (μV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960	54
At transitional frequencies the lower limit applies.	

7.2.1 E.U.T. Operation

EUT Operation: Pre-test the EUT in charging mode, motor running mode and cohere mode (with an unmodulated CW signal to the receiver), compliance test in charging mode and motor running mode as worst case was found.

7.2.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. Biconical and log periodic antenna was used for the frequency range from 30MHz to 1GHz
3. 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.
4. For super-regenerative receiver, A signal generator was used to radiate an unmodulated CW signa at its operating frequency in order to “cohere” or to resolve the individual components of the characteristic broadband emissions from the receiver.
5. 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.
6. 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.

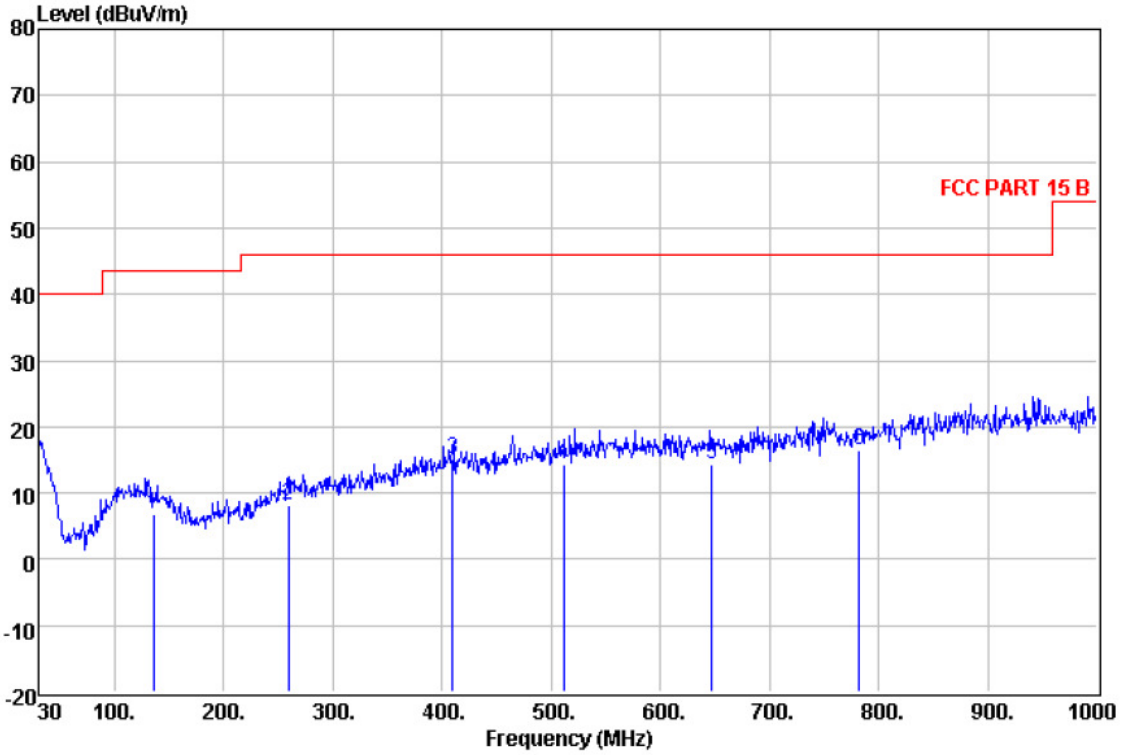
7.2.3 Measurement Data

Charging mode

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

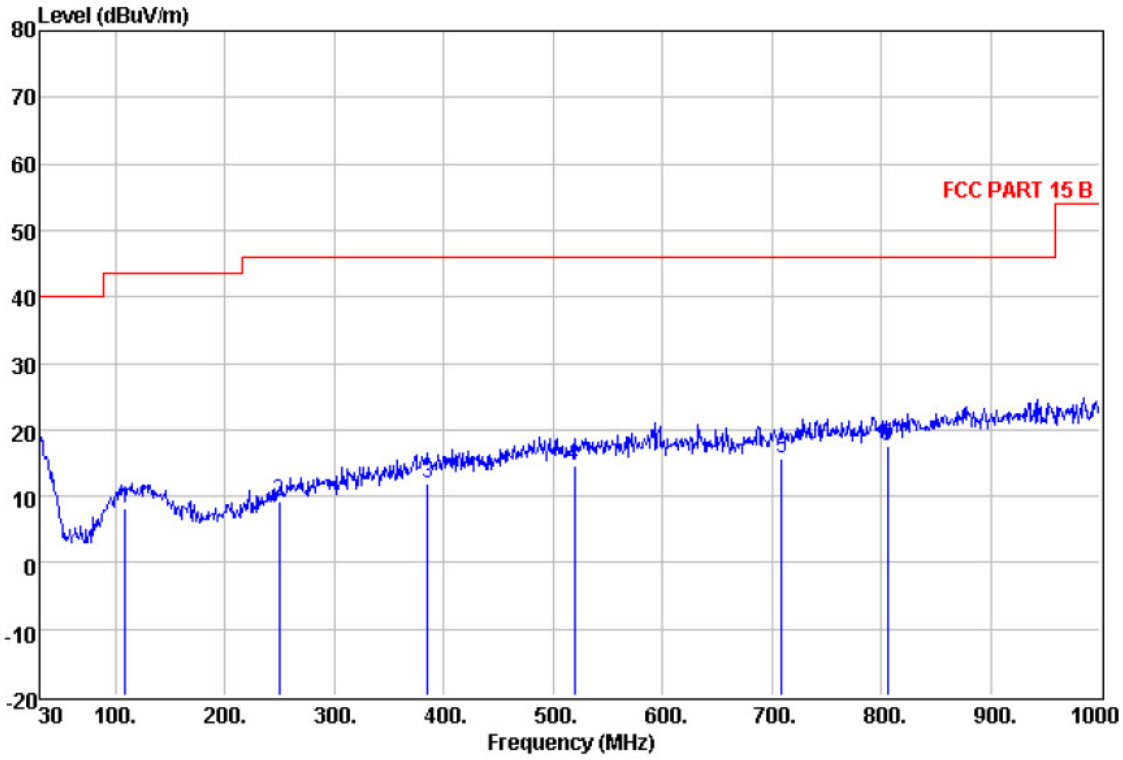
Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Over Limit	Limit Line	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dB	dBuV/m	
135.730	21.45	11.62	1.15	27.48	6.74	-36.76	43.50	QP
258.920	21.25	12.40	1.64	27.13	8.16	-37.84	46.00	QP
409.270	24.56	16.34	2.11	27.80	15.21	-30.79	46.00	QP
511.120	22.48	17.58	2.43	28.08	14.41	-31.59	46.00	QP
646.920	21.16	18.73	2.69	28.13	14.45	-31.55	46.00	QP
782.720	21.38	19.82	3.03	27.67	16.56	-29.44	46.00	QP

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

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Over Limit	Limit Line	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dB	dBuV/m	
108.570	22.81	11.81	1.04	27.63	8.03	-35.47	43.50	QP
249.220	23.10	11.55	1.60	27.15	9.10	-36.90	46.00	QP
385.020	22.00	15.56	2.05	27.68	11.93	-34.07	46.00	QP
519.850	22.67	17.52	2.44	28.11	14.52	-31.48	46.00	QP
709.000	21.53	19.20	2.82	27.86	15.69	-30.31	46.00	QP
806.000	21.90	20.15	3.12	27.57	17.60	-28.40	46.00	QP

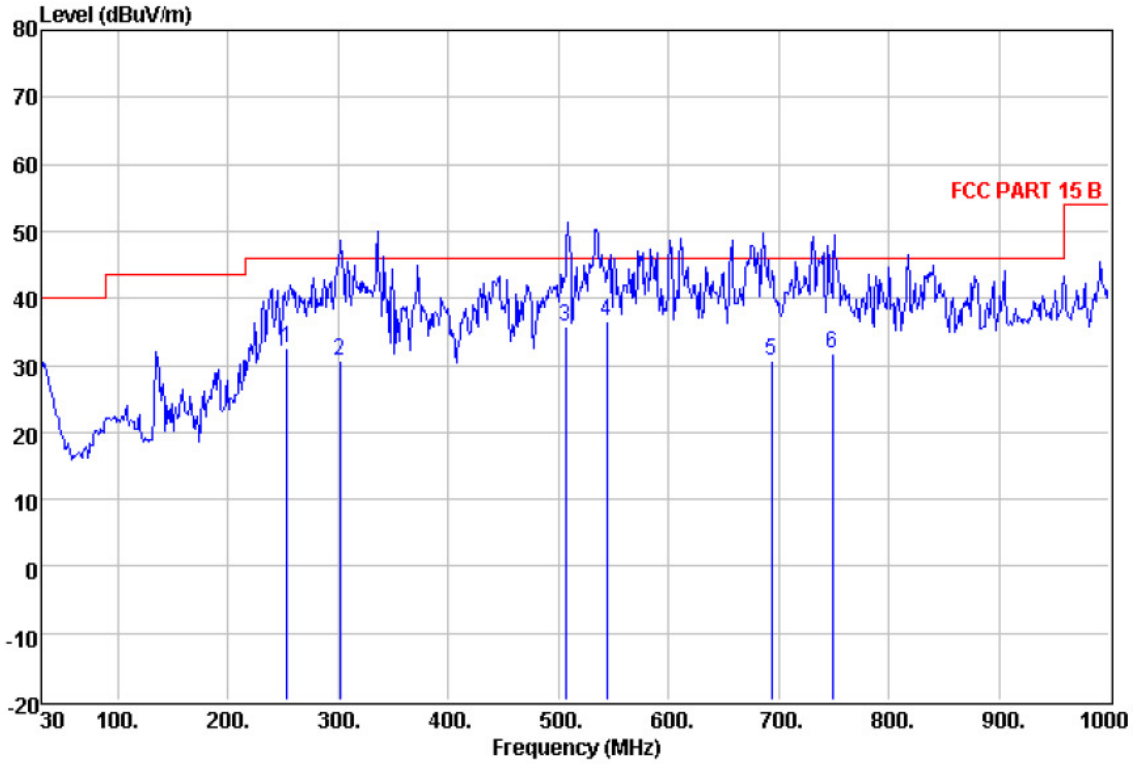
Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

Motor running mode

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

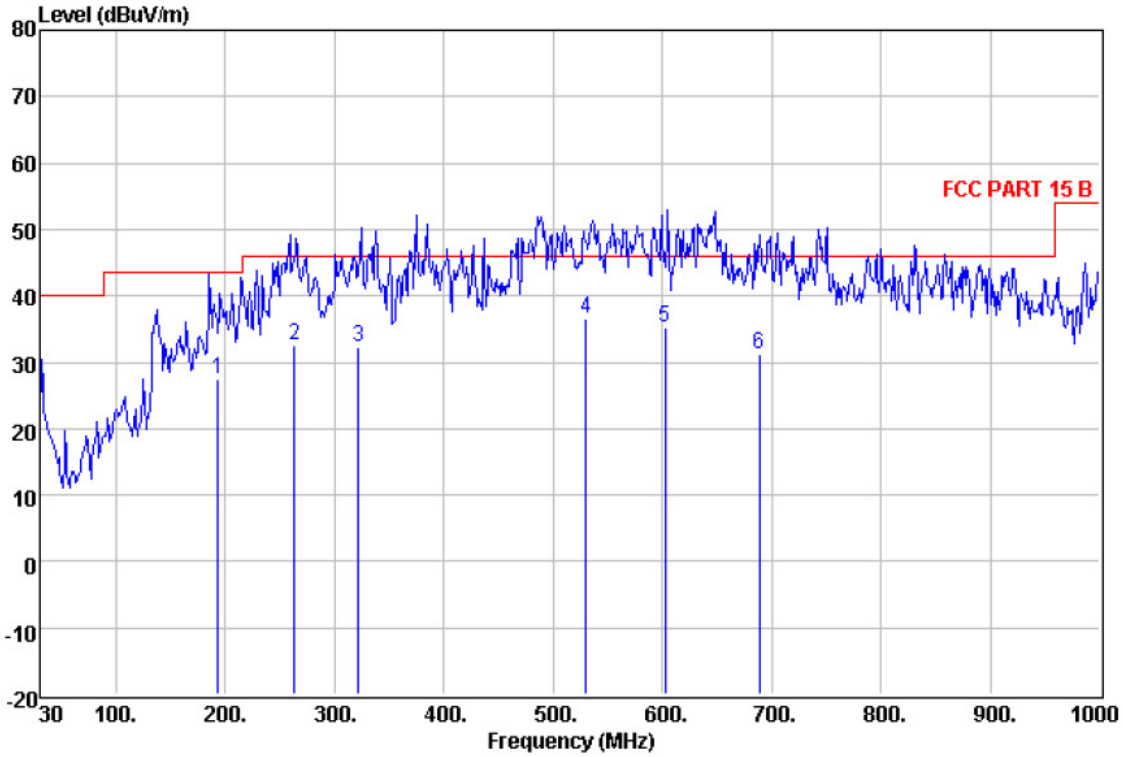
Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Over Limit	Limit Line	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dB	dBuV/m	
253.140	46.16	11.78	1.62	27.14	32.42	-13.58	46.00	QP
301.160	43.30	12.67	1.81	27.08	30.70	-15.30	46.00	QP
506.340	43.86	17.50	2.42	28.06	35.72	-10.28	46.00	QP
543.990	43.89	18.33	2.49	28.20	36.51	-9.49	46.00	QP
693.520	36.87	18.80	2.79	27.92	30.54	-15.46	46.00	QP
748.950	36.21	20.30	2.90	27.75	31.66	-14.34	46.00	QP

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

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Over Limit	Limit Line	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dB	dBuV/m	
193.500	44.78	8.55	1.29	27.26	27.36	-16.14	43.50	QP
263.440	45.61	12.34	1.66	27.12	32.49	-13.51	46.00	QP
322.040	44.00	13.54	1.87	27.24	32.17	-13.83	46.00	QP
529.720	44.40	17.90	2.47	28.15	36.62	-9.38	46.00	QP
602.183	42.24	18.74	2.61	28.37	35.22	-10.78	46.00	QP
688.340	37.64	18.68	2.78	27.93	31.17	-14.83	46.00	QP

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

7.3 Radiated Emissions above 1 GHz

N/A: Not applicable. Since Highest frequency generated or used in the device or on which the device operates or tunes (MHz) is less than 108 MHz. The spectrum was investigated up to 1 GHz.

--End of Report--