CMA Testing and Certification Laboratories
廠商會檢定中心

TEST REPORT

Report No. : AW0022764(0) Date : April 27, 2018

Application No. : LW005218(5)

Applicant : Toy Shock International Limited
Unit 302-303, 3/F, Tower B,
New Mandarin Plaza, 14 Science Museum Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong

Sample Description : One(1) item of submitted sample stated to be:

Sample Description	Model No.
Wave Racer	300060A
Wave Breaker	300062A

Radio Frequency : 49.86MHz
Rating : 1 x 9V battery
No. of submitted sample : One (1) piece
Sample registration No. : RW009225-007(3)

Date Received : February 13, 2018

Test Period : March 3, 2018 – April 6, 2018

Test Requested : FCC 47CFR Part 15 Certification and RSS-310 Verification.

Test Method : 47 CFR Part 15 (10-1-17 Edition)
RSS-310 Issue 4, July 2015
ANSI C63.10 – 2013

Test Result : See attached sheet(s) from page 2 to 15.

Conclusion : The submitted sample was found to comply with requirement of FCC 47CFR Part 15 Subpart C and RSS-310 Issue 4.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____ Page 1 of 15
Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

FCC ID: 2AHUVCXT3313-4

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Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatcl.com Web Site: http://www.cmatcl.com

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1 General Information

1.1 General Description

The equipment under test (EUT) model 300060A is a remote controlled toys. It operates at frequency band 49.86MHz for transmitter. The oscillation of radio control is generated by a 49.86MHz crystal and modulated by transistor, Q2. The EUT is powered by one 9V battery. The EUT contains two control levers to control moving direction and a ON/OFF switch.

The model: 300062A is identical as model 300060A on the remote control unit (transmitter). The difference is only on the outlook of the remote controlled boat (receiver).

The wire antenna is used in EUT and the radio output power is unable to adjust.

The brief circuit description is listed as follows:

- S1-S4 and K1	and its associated circuit act as switch and control lever
- U1	and its associated circuit act as MCU
- X1	and its associated circuit act as oscillation clock
- Q2	and its associated circuit act as modulator
- Q1	and its associated circuit act as amplifier
- C8, C4, L3	and its associated circuit act as low-pass filter

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1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2014. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2014. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

FCC Accredited Lab (Designation Number: HK0004)
ISED Wireless Test Site (ISED Assigned Code: 4093A

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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	Rohde & Schwarz	ESCS30	100001	01 Feb 2019	1Year
EMI Test Receiver	Rohde & Schwarz	ESCI	100152	07 Dec 2018	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100964	08 Feb 2019	1Year
Broadband Antenna	Schaffner	CBL6112B	2692	29 Mar 2020	2Years
Loop Antenna	EMCO	6502	00056620	25 Jan 2020	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	21 Dec 2018	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	21 Dec 2018	2Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	02 Aug 2018	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	02 Aug 2018	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	18 May 2018	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	18 May 2018	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	21 Dec 2018	1Year
LISN	Rohde & Schwarz	ENV216	101323	16 Jan 2019	1Year
Coaxial Cable	Tyco Electronics	RG 58C/U	N/A	24 Oct 2018	1Year

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1.4 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

Radiated emissions

Frequency	Uncertainty (U_{lab})
30MHz ~ 200MHz (Horizontal)	4.59dB
30MHz ~ 200MHz (Vertical)	4.49dB
200MHz ~1000MHz (Horizontal)	4.94dB
200MHz ~1000MHz (Vertical)	4.97dB
1GHz ~ 6GHz	4.52dB

1.5 Test Summary

TEST ITEM	FCC REFERANCE	RSS REFERENCE	RESULT
Fundamental emission	15.235(a)	RSS-310 section 3.9	Comply
Out-band emission	15.235(b)	RSS-310 section 3.9	Comply
26dB down bandedge	15.235(b)	N/A	Comply
Bandwidth	15.215(c)	RSS-Gen	Comply

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2 Description of the radiated emission test

2.1 Test Procedure

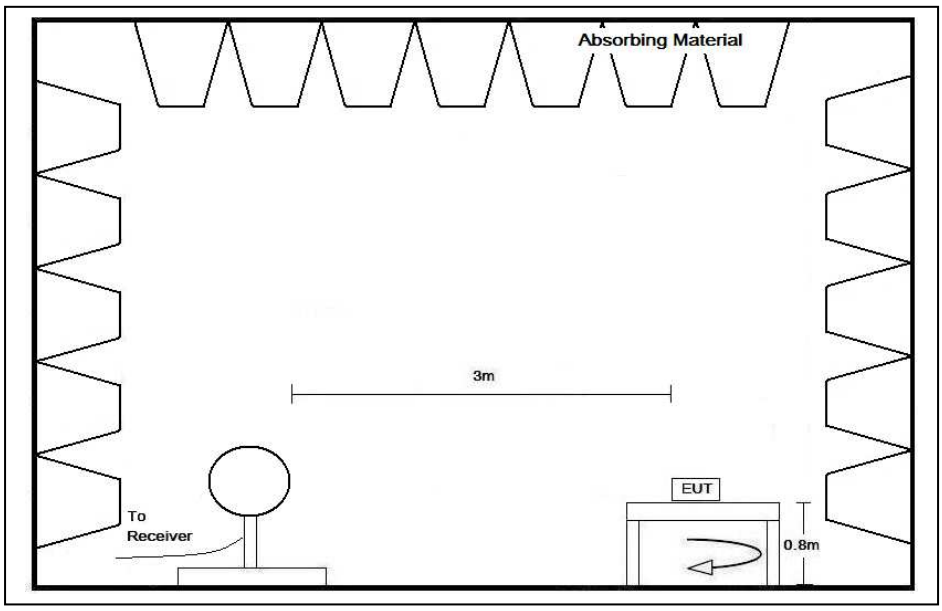
Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013.

A non-conductive turntable with dimensions of 1.5m x 0.4m x 0.8m (L x W x H) placed above the reference ground plane. The equipment under test (EUT) was placed at 0.8m height for below 1GHz measurement and 1.5m height for above 1GHz measurement. The test distance is 3m between EUT and receiving antenna. A broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated. Additional absorbing material will be placed between the EUT and receiving antenna for above 1GHz measurement.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

2.2 Test Setup



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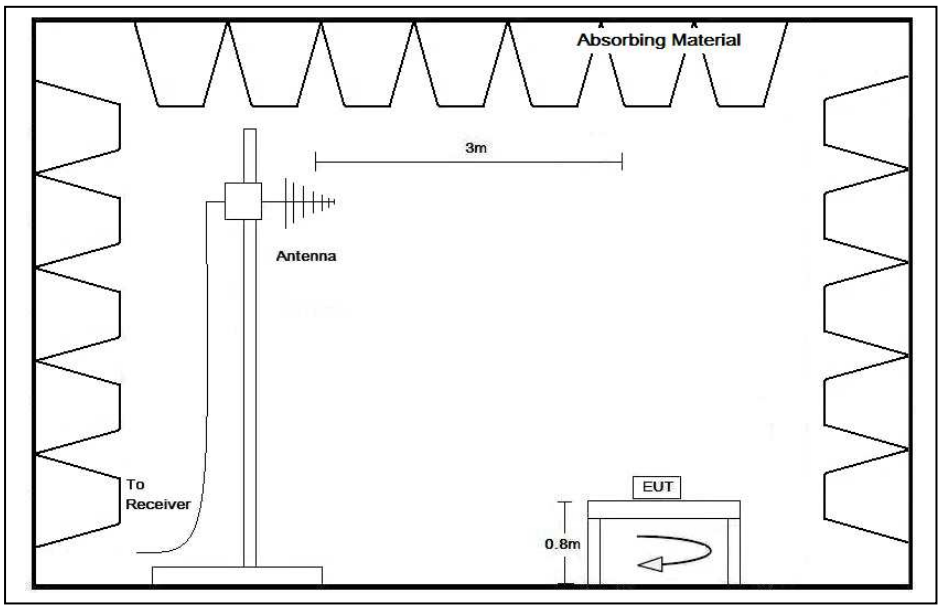
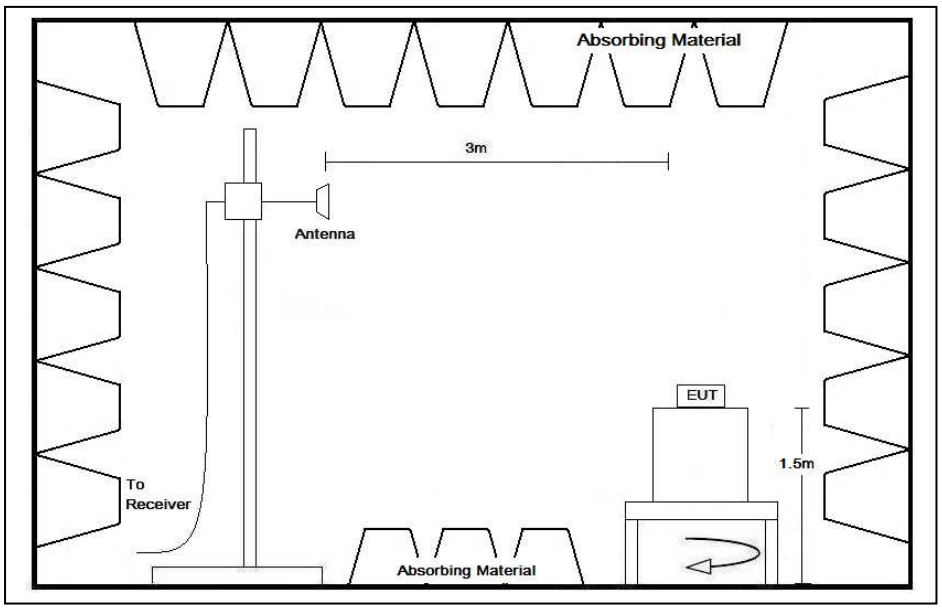
Below 30MHz



30MHz – 1GHz

2.2 Test Setup



Above 1GHz

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2.3 Test Result

Peak Detector data was measured unless otherwise stated.

The radiated emissions are measured from 9kHz to 500MHz (the tenth harmonics)

The worst case configuration is shown on the worst case configuration of test setup photo.

The frequencies from fundamental up to tenth harmonics were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next pages.

The EUT has been tested in Transmission mode.

It was found that the EUT meet the FCC requirement and RSS requirement.

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2.4 Radiated Emission Measurement Data

Radiated emission

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	22.3	° C
Relative humidity:	59.3	%

Polarization	Frequency (MHz)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Detector Type
V	49.862	65.1	11.3	76.4	80.0	-3.6	Peak
V	49.867	57.0	11.3	68.3	80.0	-11.7	Peak
V	99.731	9.4	10.2	19.6	43.5	-23.9	Peak
H	149.551	6.4	13.5	19.9	43.5	-23.6	Peak
H	199.346	3.2	15.3	18.5	43.5	-25.0	Peak
H	249.312	6.5	14.5	21.0	46.0	-25.0	Peak
V	299.161	5.6	14.5	20.1	46.0	-25.9	Peak

Remark: All other emission below the limit more than 20dB are not reported in this report.

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3 Description of the Line-conducted Test

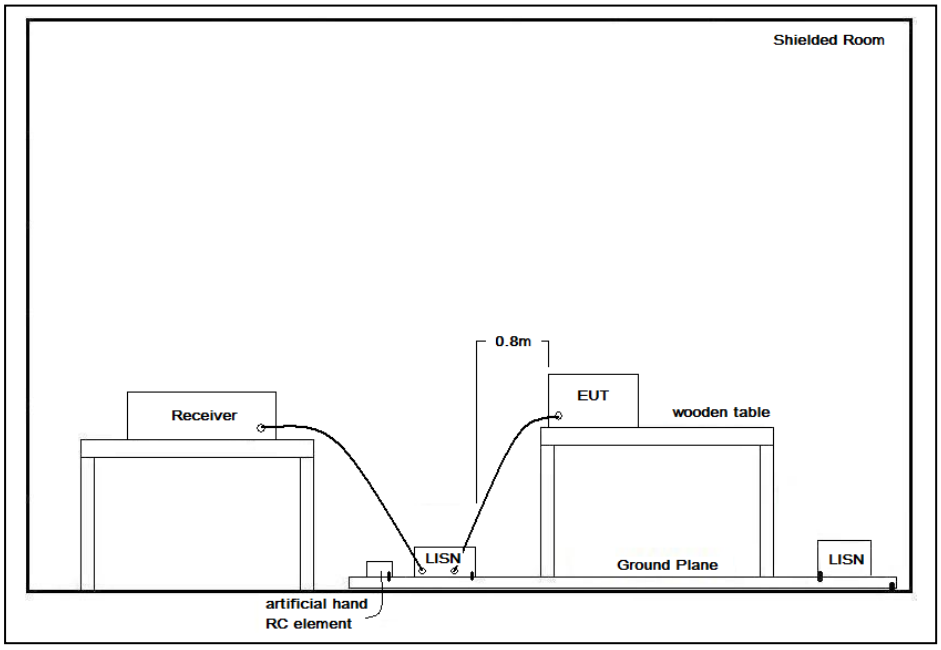
3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

No measurement is required as the EUT is a battery-operated product.

3.3 Test Setup



3.4 Graph and Table of Conducted Emission Measurement Data

Not Applicable

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4 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

Document	Filename
ID Label/Location	Label Artwork and Location.pdf
Block Diagram	Block Diagram.pdf
Schematic Diagram	Schematic.pdf
Users Manual	User Manual.pdf
Operational Description	Operation Description.pdf

4.1 Bandwidth

Appendices A1 is shown the fundamental emission is confined in the specified band. 20dB bandwidth and 99% bandwidth are 8.44kHz and 16.5kHz and both bandwidth are within the assigned band. It also shows that the EUT meets the FCC Part 15.215(c) and RSS-Gen requirement.

From 26dB bandwidth plot, it shows that the emissions below 49.85416MHz and above 49.8694MHz are below 26dBc. So it comply the requirement of FCC section 15.235(b).

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5 Appendices

A1. Bandwidth Plot 1 page(s)

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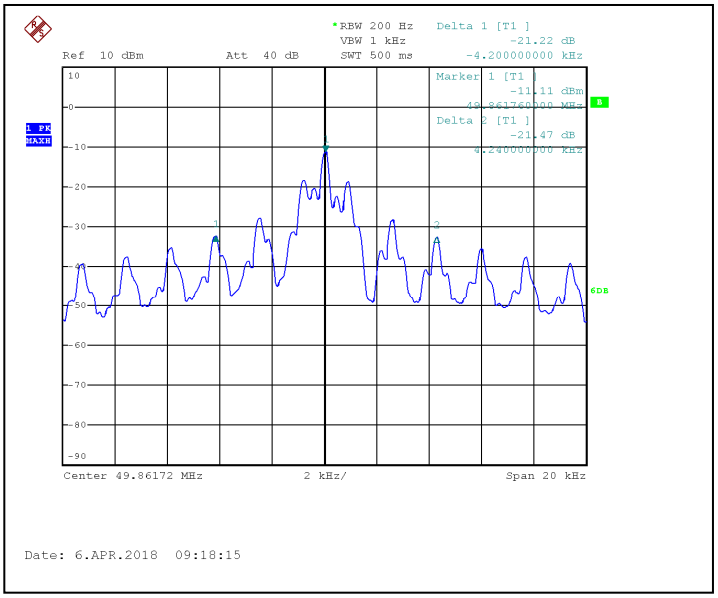
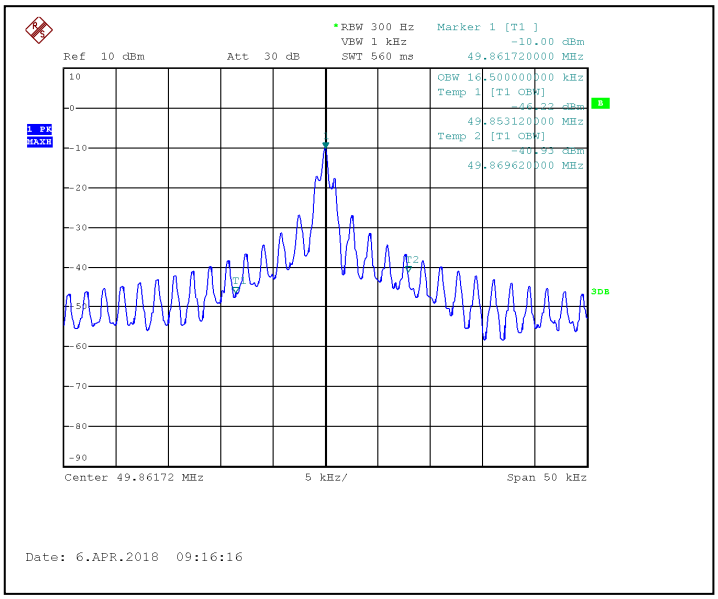
A1. Bandwidth Plot



20dB Bandwidth



99% Bandwidth

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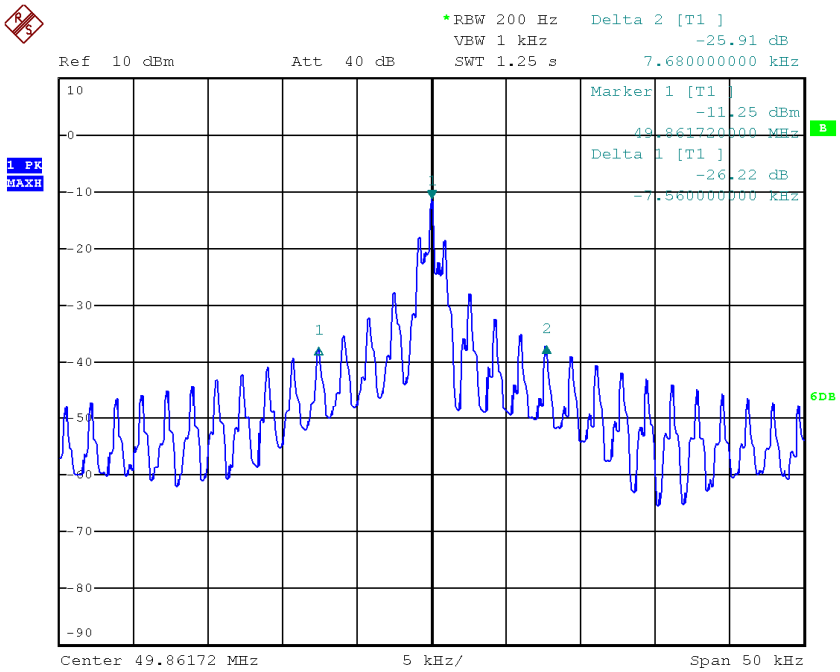

Date: 6.APR.2018 09:19:59

26dB Bandwidth

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