FCC Test Report

Application No.:	T31620220013EM
Applicant:	KIDZTECH TOYS MANUFACTURING LTD.
Address:	Rm 1201, Inter-Continental Plaza, 94 Granville Road, TST, Hong Kong.
Product Information:	
Product Description:	1/6 R/C KAWASAKI BRUTE FORCE 750 ATV QUAD
Item No.:	84011 / 84331 / 84052 / 5F633E3 / 267336 / 228311 / 897143 / 1160483 / 107686…♣
♣	Please refer to section 2 of this report which indicates which item was actually tested and which were electrically identical.
Country of Origin:	China
Age Grading:	6+
Product Class :	Low Power Communication Device – Transmitter (27.145MHz)
FCC ID :	OTM-8401116-27MTX
Requirement:	CFR 47 FCC PART 15 SUBPART C, 2015 - Intentional Radiators.(Section 15.227)
Date of Receipt:	2016-06-07
Date of Test:	2016-06-20 to 2016-06-28
Date of Issue:	2016-06-29

Test Result :	**PASS***

* In the configuration tested, the EUT complied with the requirements for the relevant clauses of Federal Communications Commission Rules as specified above.

Authorized Signature:

CHEN Jian-feng, Jeffrey

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 Test Summary

Test	Test Requirement	Test Method	Result
Conducted Emission (150KHz to 30MHz)	FCC PART 15, SUBPART C: 2015	ANSI C63.10:2013	N/A[1)]
Radiated Emission below 30MHz	FCC PART 15, SUBPART C: 2015	ANSI C63.10:2013	PASS
Radiated Emission (30MHz to 1GHz)	FCC PART 15, SUBPART C: 2015	ANSI C63.10:2013	PASS
Radiated Emission above 1 GHz	FCC PART 15, SUBPART B: 2015	ANSI C63.10:2013	N/A[1)]

Remark : Please refer to section 6.1 & 6.4 of this report for explanation

♣ Item no.: 84011 / 84331 / 84052 / 5F633E3 / 267336 / 228311 / 897143 / 1160483 / 107686
According to the confirmation from the applicant, the above models are identical in all electrical aspects in relating to the circuit design, PCB layout, electrical components used, internal wiring and function. The differences are only the model no., color and decorations

Therefore only the model as shown on 7.2 was tested in this report.

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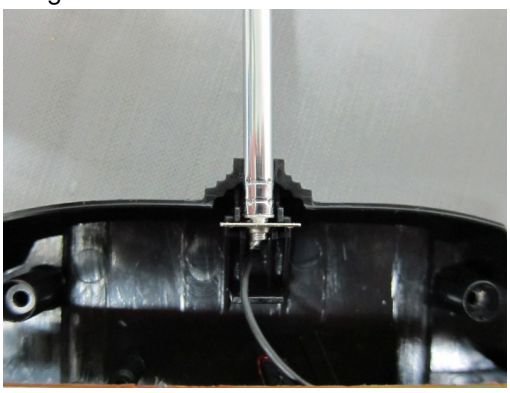
4 General Information

4.1 General Description of EUT

EUT Name:	1/6 R/C KAWASAKI BRUTE FORCE 750 ATV QUAD
Item No.:	84011 / 84331 / 84052 / 5F633E3 / 267336 / 228311 / 897143 / 1160483 / 107686
Serial No.:	--

4.2 Details of EUT

Power Supply:	DC 9V (6F22 battery x 1) for TX
Power Cord:	--
Antenna type	Integral antenna



antenna use unique antenna jack

Operating frequency:	27.145MHz
Modulation Type:	PCM

4.3 Conditions of EUT

The received sample was under good condition.

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

CFR 47, FCC Part 15, Oct 2015
ANSI C63.10:2013

4.6 Test Location

All tests were performed at: -

SGS IECC Limited (Member of the SGS Group (SGS SA))

Units 303-305, 3/F., 31 Lok Yip Road, On Lok Tsuen, Fanling, N.T., Hong Kong

Tel: +852 2305 2570 Fax: +852 2756 4480.

No tests were sub-contracted.

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4.7 Test Facility

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

- **FCC – CAB Registration No.: 446297**

  Measurement facility located at Fanling (Hong Kong), accredited as a Conformity Assessment Body (CAB) and was designated by FCC to perform compliance testing on equipment subject to Declaration Of Conformity (DOC) and Certification under Part 15 and 18 of the Commission's Rules.

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4.8 Deviation from Standards

None.

4.9 Abnormalities from Standard Conditions

None.

4.10 Declaration of Family Grouping

None.

4.11 Abbreviations

N/A: Not Applicable
EUT: Equipment Under Test

4.12 Measurement Uncertainty (95% confidence levels, k=2)bbreviations

No.	Item	Measurement Uncertainty
1	Radiated disturbance 9 kHz - 30MHz	4.2
2	Radiated disturbance 30MHz – 1GHz	5.5
3	Radiated disturbance 1GHz – 18GHz	5.5
4	Conducted Emissions	3.1

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5 Equipments Used during Test

Radiated Emission				
Equipment	**Manufacturer**	**Model / Serial No.**	**Cal. Date**	**Cal. Due Date**
3m Semi-Anechoic Chamber (pre-test)	--	--	--	--
3m / 10m Open Aera Test Site	--	--	2015/03/11	2018/03/10
Test Receiver	Rohde & Schwarz	ESCS 30 / 100388	2015/09/29	2016/09/28
Spectrum Analyzer	Rohde & Schwarz	FSP30 /101474	2016/05/30	2017/05/29
Antenna (30-1000 MHz)	Schaffner	CBL6111C / 2791	2014/10/19	2016/10/18
Loop Antenna	Rohde & Schwarz	HFH2-Z2 / 871336/48	2016/01/23	2019/01/22
Coaxial Cable	--	E167	2016/06/25	2017/06/24
Antenna Mast System	Schwarzbeck	AM9104 / -	--	--
Turntable with Controller	Drehtisch	DT312 / -	--	--

General Use Equipment				
Equipment	**Manufacturer**	**Model / Serial No.**	**Cal. Date**	**Cal. Due Date**
Digital Multimeter	Fluke	189 / 83640020	2016/04/20	2017/04/19
Temperature / Humidity meter	-	E159	2015/10/07	2016/10/06

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6 Test Results

6.1 Conducted Emissions Mains Terminals, 150 kHz to 30MHz

Test Requirement: FCC Part15 C

Test Method: ANSI C63.10

Test Date: Not Applicable

Remark:

The product is battery operated and this test is not applicable.

6.2 Radiated Emissions below 30MHz

Test Requirement: FCC Part15 Subpart C Section 15.227 and 15.209

Test Method: ANSI C63.10

Test Date: 2016-06-20

Frequency Range: 9kHz to 30MHz

Measurement Distance: 3 m

Detector: Peak for pre-scan
(200Hz resolution bandwidth for measurement between 9kHz – 150kHz)
(9kHz resolution bandwidth for measurement between 150kHz – 30MHz)
Peak for final measurement within the operation band
Quasi-Peak for final measurement outside the operation band

Limits :

(a) Measurement within operation band :

Average detector: 10000μV/m (or 80 dB(μV/m)) at 3 m

Peak detector: 100 dB(μV/m) at 3m

(b) Measurement outside operation band :

Frequency range (MHz)	Field strength limits (μV/m)	Measurement distance (m)
0.009 to 0.490	2400/F(kHz)	300
0.490 to 1.705	24000/F(kHz)	30
1.705 to 30.0	30	30
Note: At transitional frequencies the lower limit applies.		

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6.2.1 EUT Operation

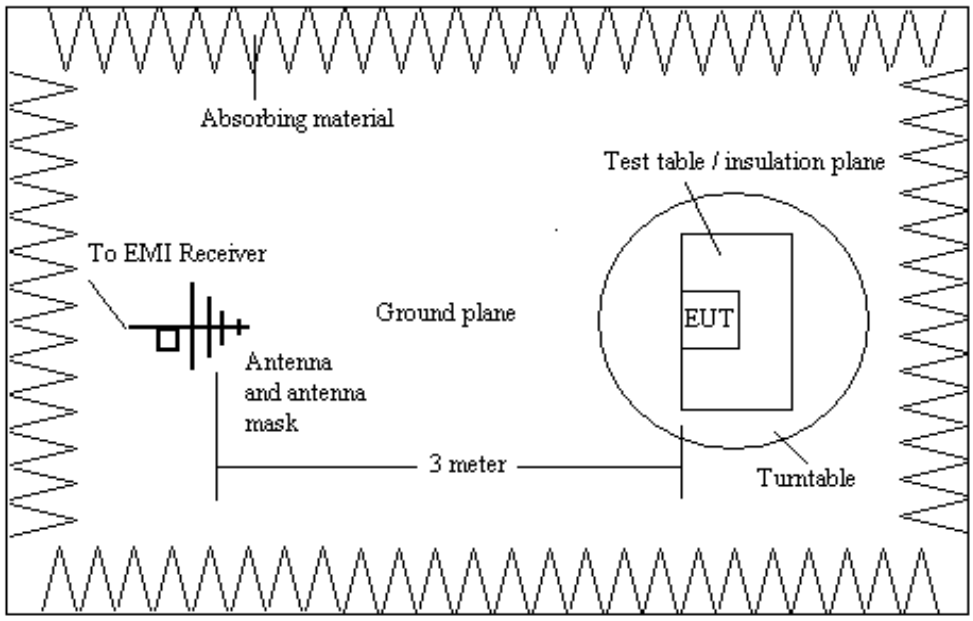
Operating Environment:

Temperature: 29 °C Humidity: 60 %

EUT Operation: Pre-test with Peak detector with the following mode(s):
1. Control for different direction with both control button or single button

Final test with Peak detector with the following mode(s):
1. Control with up direction of left control button

6.2.2 Test Setup and Procedure



1. The pre-test of the radiated emissions test was conducted in a semi-anechoic chamber and the final measurement was conducted in the open area test site.
2. The EUT was operated with new battery. The EUT was placed upon a non-metallic table 0.8m above the floor.
3. A loop antenna for the frequency range 9kHz - 30MHz, connected with 10 meters coaxial cable to the test receiver was used for measurement. The center of the loop was 1 m above the floor, positioned with its plane vertical at the specified distance and rotated about its vertical axis and placed horizontal for maximum response at each azimuth about the EUT.
4. An initial pre-scan was performed to find out the maximum emission level of the sample placed at 3 orthogonal planes and with the turntable rotated 360°. Final measurement was then performed to record the data for fundamental emission within the operation band and spurious emissions outside the band under worst-case condition for combination of the antenna orientation and turntable position.

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5. Emission at the fundemental frequency for this pulse modulated device was measured with the peak detector function of the test receiver and was properly adjusted for the duty cycle correction factor as pulse desensitization to calculate the average emission value.

6.2.3 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured by loop antenna with 3 orthogonal polarities. Final measurement was conducted in the open area test site with data as follows:

(a) Measurement within operation band :

Frequency (MHz)	Antenna Polarity	Test Results (dBμV/m)		FCC Limit (dBμV/m)	
		Peak	Average *	Peak	Average
27.145	Horizontal	48.79	44.38	100	80
	Vertical	56.19	51.78	100	80

Note : (1) The above peak value is the maximum value of the measurement in the 3 orthogonal planes

(2) * Calculation for radiation (average) :

Formula:

Duty cycle = (N1L1 + N2L2 + … + Nn-1Ln-1 + NnLn) / 100 or T

where

N1 is the number of type 1 pulse; L1 is length of type 1 pulse, etc.

T is the period of the pulse train (if less than 100ms)

According to the time domain plots shown on the next two pages:

Duty cycle of the EUT = (0.52 x 10 +1.56 x 4) / 19

= 0.602

Av correction factor = 20 x log (0.602) dB

= - 4.41 dB

Radiation (average) = Radiation (peak) + Av correction factor

Radiation (average) of the EUT = 48.79 – 4.41 dB(μV/m) = 44.38 dB(μV/m) (Horizontal ant.)

= 56.19 – 4.41 dB(μV/m) = 51.78 dB(μV/m) (Vertical ant.)

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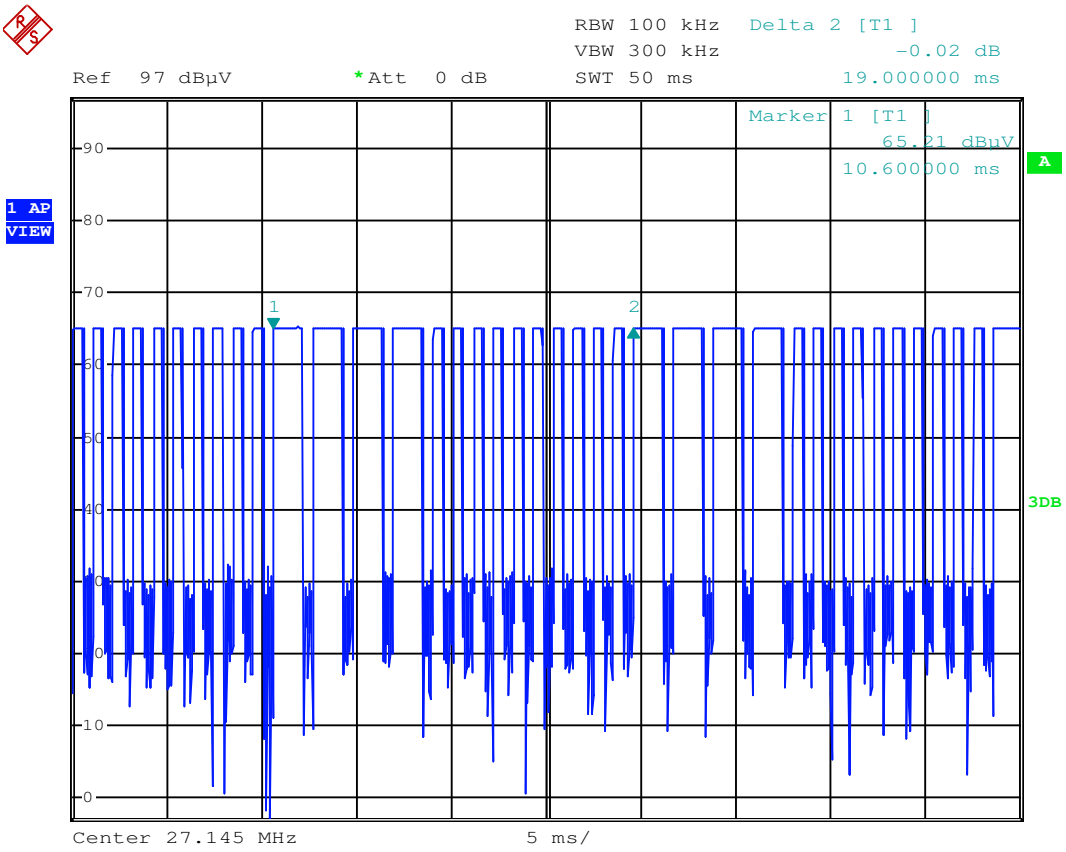
(b) Measurement outside operation band :

The spurious radiated emissions measured by the loop antenna were negligible (more than 20dB below limit), so the test data were not recorded in the test report.

Time Domain Plots (Fundamental frequency of Transmitter) :



Pulse cycle period = 19.0 ms

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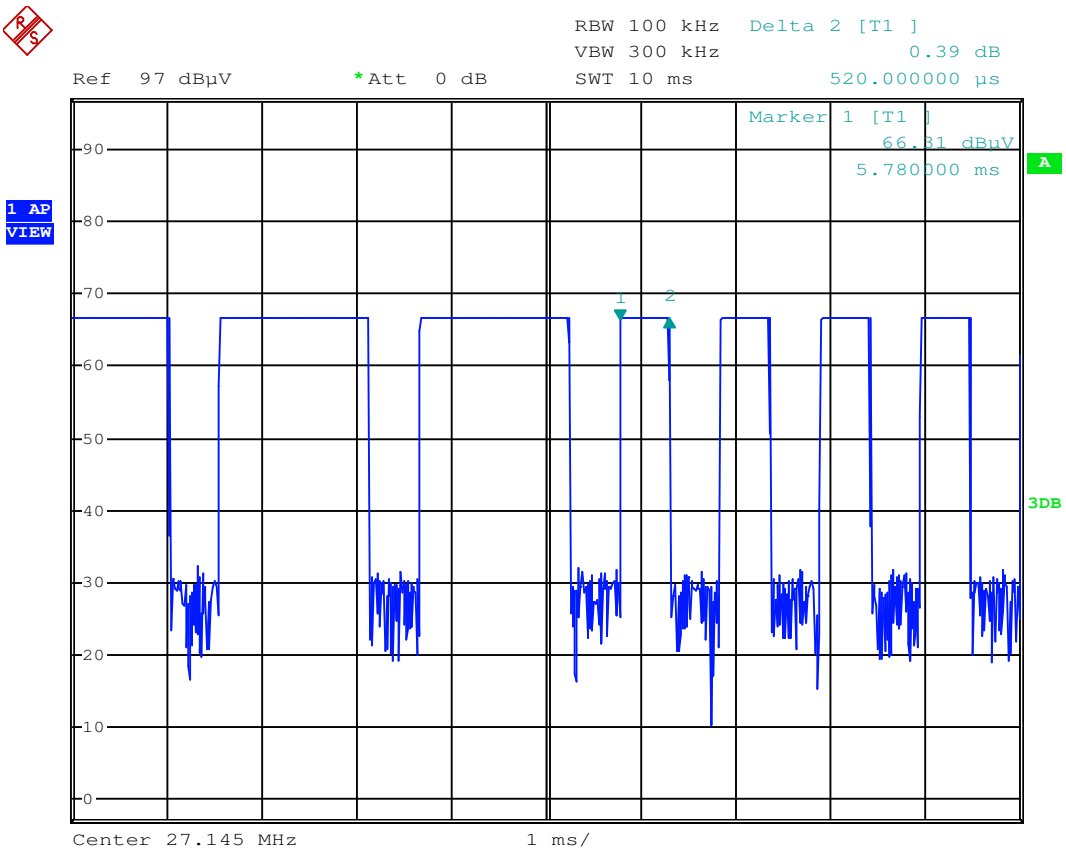
Time Domain Plots (Fundamental frequency of Transmitter) :



Pulse width = 0.52ms (total no. of pulse: 10)

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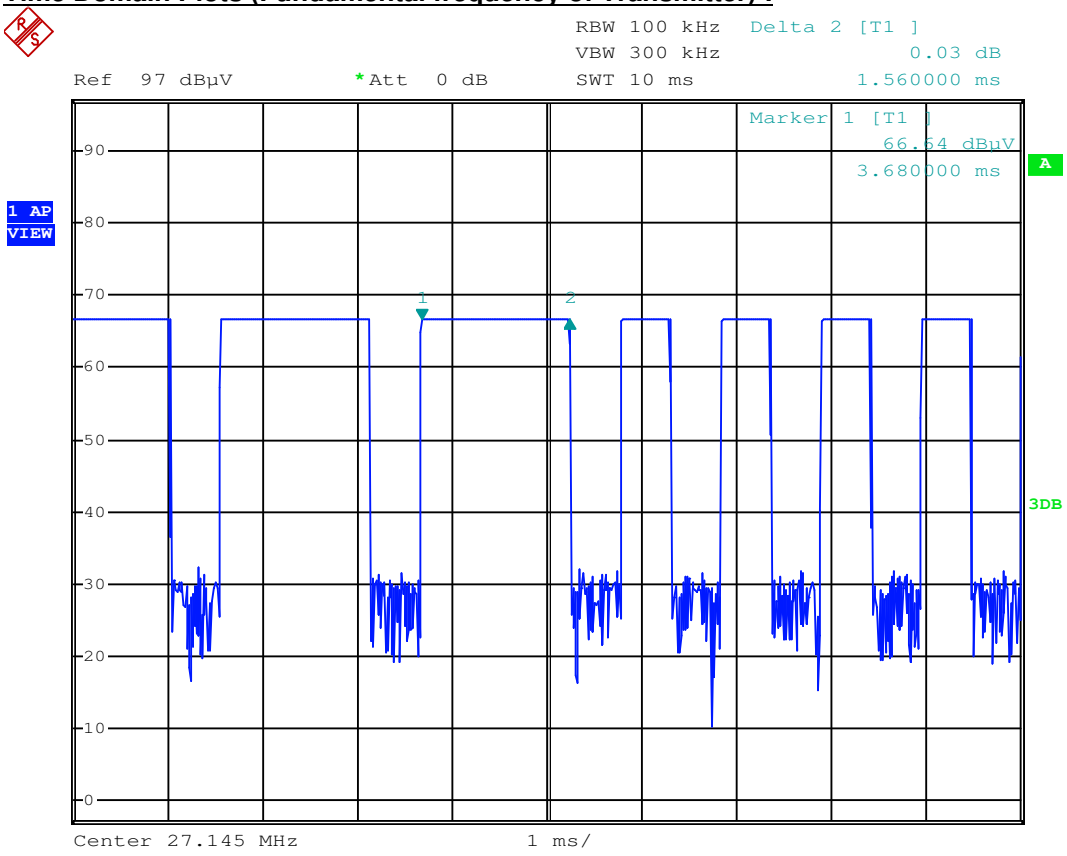
Time Domain Plots (Fundamental frequency of Transmitter) :



Pulse width = 1.56ms (total no. of pulse: 4)

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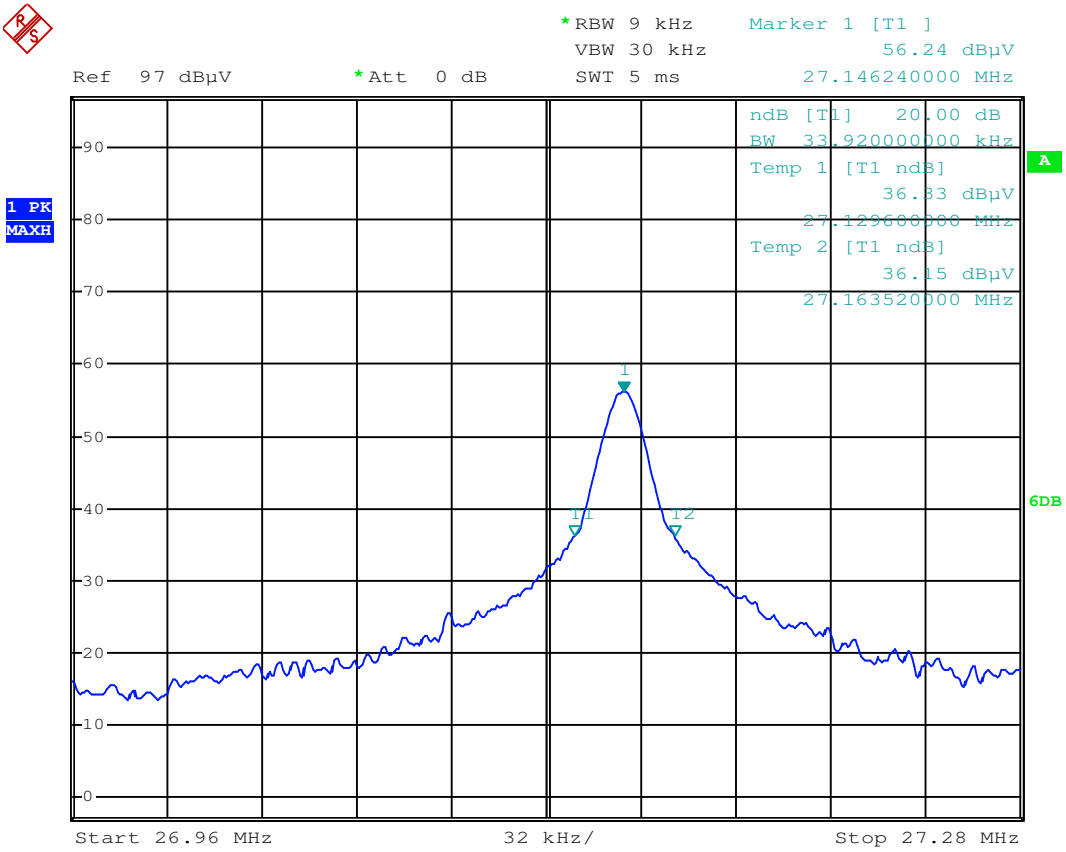
Band Edges Plot:



The field strength of any emission within the operation band did not exceed 80 dB (µV/m) for average value or 100 dB (µV/m) for peak value.

From above plot, at the bandedge, 26.96MHz and 27.28MHz are more than 20dB down from the 27.145MHz carrier, which is below 49.5dBuV/m and met the requirement of 15.209.

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6.3 Radiated Emissions, 30MHz to 1GHz

Test Requirement:	FCC Part15 Subpart C Section 15.209
Test Method:	ANSI C63.10
Test Date:	2016-06-28
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-peak for final test (120kHz resolution bandwidth)

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
Note: At transitional frequencies the lower limit applies.	

6.3.1 EUT Operation

Operating Environment:

Temperature: 29 °C Humidity: 60 %

EUT Operation: Pre-test with Peak detector with the following mode(s):

1. Control for different direction with both control button or single button

Final test with Quasi-Peak detector with the following mode(s):

1. Control with up direction of left control button

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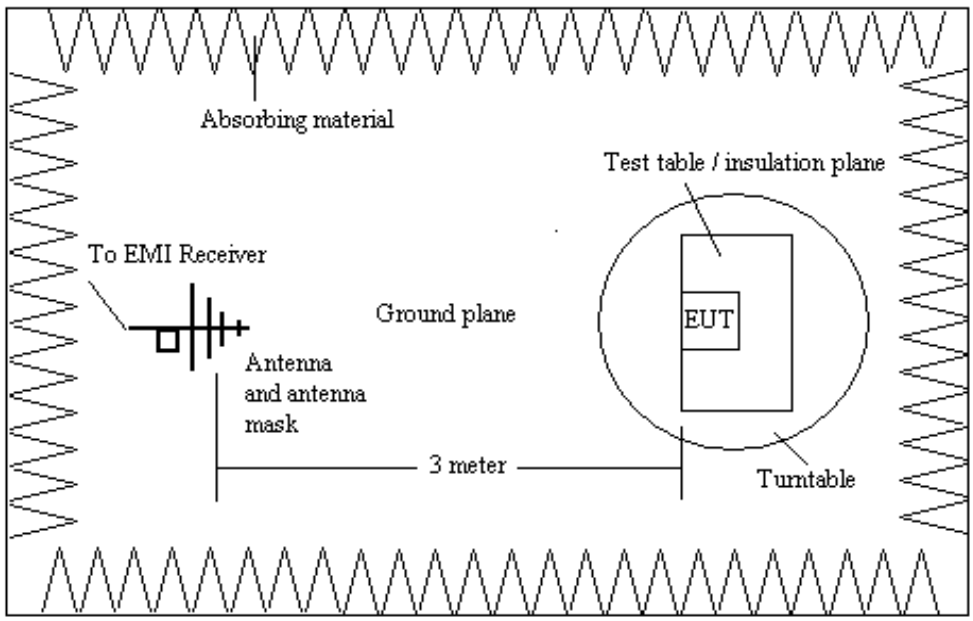
6.3.2 Test Setup and Procedure



1. The pre-test of the radiated emissions test was conducted in a semi-anechoic chamber and the final measurement was conducted in the open area test site.
2. The EUT was operated with new battery. The EUT was placed upon a non-metallic table 0.8m above the ground reference plane.
3. Bilog antenna was used for the frequency range from 30MHz to 1GHz
4. 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 with located frequencies.
5. The actual frequencies of maximum emission were confirmed 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.

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6.3.3 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured by Bilog antenna with 2 orthogonal polarities and frequencies of peak emissions from the EUT were detected within 6dB of the limit line. Final measurement was conducted in the open area test site with data as follows:

Test results on operation with up direction of left control button mode:

Frequency (MHz)	Antenna Polarization	Correction Factor (dB/m)	Receiver QP Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)
31.625	V	18.8	3.8	22.5	40.0	-17.5
40.938	V	15.1	4.1	19.2	40.0	-20.8
54.125	V	11.2	4.3	15.5	40.0	-24.5
86.188	V	9.4	5.0	14.4	40.0	-25.6
114.250	H	11.1	5.0	16.1	43.5	-27.4
193.813	H	9.4	4.9	14.3	43.5	-29.2

Note:

1) All readings are Quasi-Peak values.

2) Correction Factor = Antenna Factor + Cable Loss.

3) The above results were the worst case results with the EUT positioned in all 3 axis during the test. The EUT was positioned vertically and horizontally on the table for vertical and horizontal measurement respectively and with its antenna fully extended.

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6.4 Radiated Emissions above 1 GHz

Test Requirement: FCC Part15

Test Method: ANSI C63.10

Test Date: Not Applicable

Remark:

There is no need for Radiated Emissions (above 1G) test to be performed on this product in accordance with FCC Part 15: 2013 because the tenth harmonic of the highest fundamental frequency is less than 1 GHz.

For further details, please refer to Subpart A section 15.33 (a) (1)of FCC Part 15 which states:

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Remark:Test frequency is 27.145 MHz.

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7 Photographs

7.1 Radiated Emission Test Setup

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7.2 EUT Constructional Details

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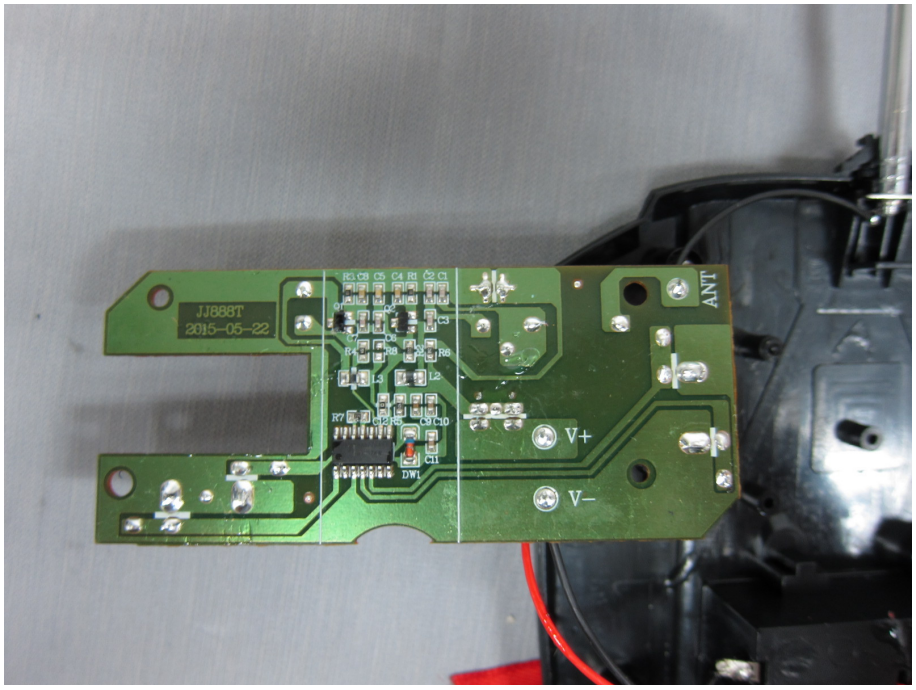
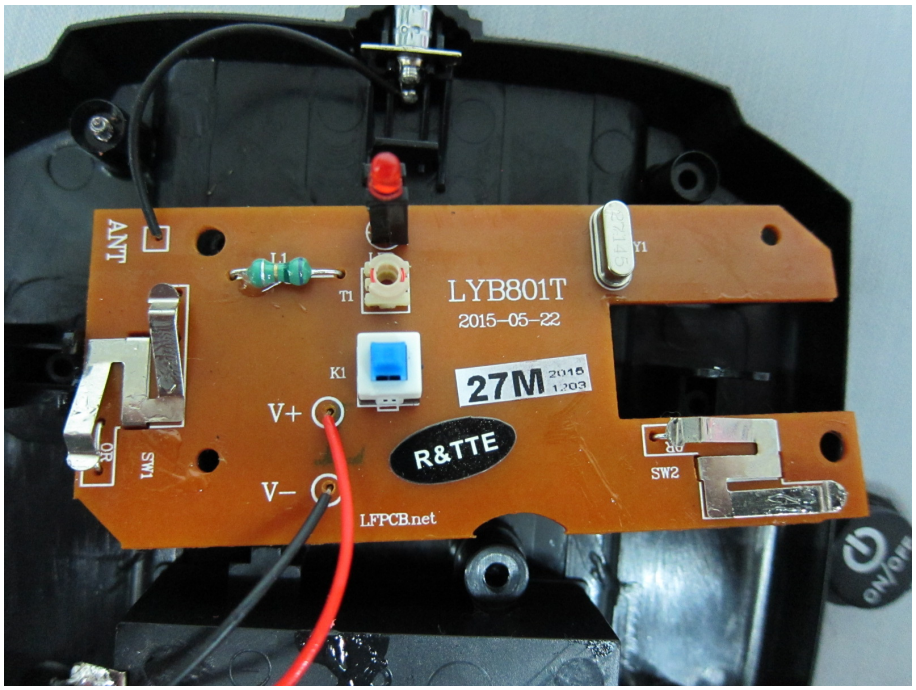
7.3 Internal photo





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