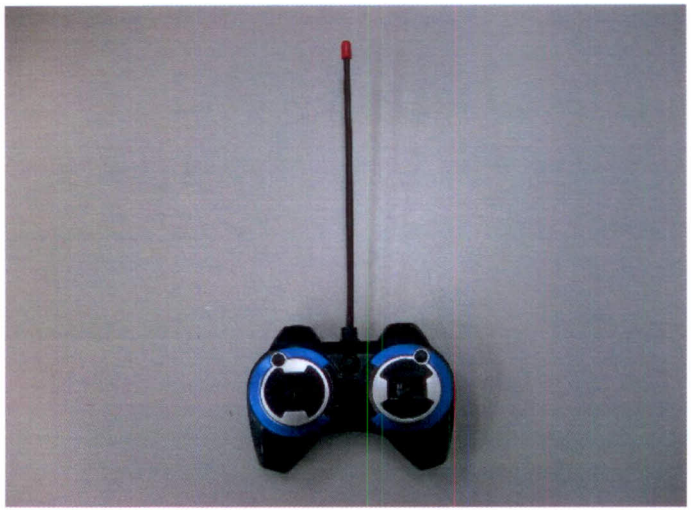
TEST REPORT No.: (5213)080-1693

TEST REPORT

To:	**GRANDEX INTERNATIONAL DEVELOPMENT LTD**	To:	-
Attn:	KAT CHEUNG	Attn:	-
Address:	2401, MILLION FORTUNE INDUSTRIAL CENTRE, 34-36 CHAI WAN KOK STR, TSUEN WAN, HONG KONG	Address:	-
Fax:	852 24053950	Fax:	-
E-mail:	kat@grandex.com.hk / ivy@grandex.com.hk	E-mail:	-
Folder No.:	--		
Factory Name:	--		
Location:	--		
Product:	RADIO CONTROL VEHICLES Model No.: 61206		



Sample No:	(5213)080-1693
Test Date(s):	March 6, 2013 to March 28, 2013
Test Requested:	FCC Part 15 – 2011
Test Method:	ANSI C63.4 – 2009
FCC ID:	VC961206127

The results given in this report are related to the tested specimen of the described electrical apparatus.

CONCLUSION: The submitted sample was found to COMPLY with requirement of FCC Part 15 Subpart C.

Authorized Signature:

Reviewed by: Keith Yeung	Approved by: Steven Tsang
Date: April 5, 2013	Date: April 5, 2013

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Test Result Summary

EMISSION TEST			
Test requirement: FCC Part 15 - 2011			
Test Condition	Test Method	Test Result	
		Pass	Failed
Radiated Emission Test, 9kHz to 1GHz	ANSI C63.4	☒	☐

Report Revision & Sample Re-submit History:

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Test Laboratory & Test Instruments List

Radiated and Conducted emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2009. An Open Area Test Site and Full Anechoic Chamber (FCC Listed Site, Registration No. 642151) are set up for investigation and located at:

BUREAU VERITAS HONG KONG LIMITED, EMC CENTRE

No. 2106-2107, 21/F., Westin Centre,
26 Hung To Road,
Kwun Tong, Kowloon,
Hong Kong

Test Instrument List

Radiated Emission

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATION DUE
EMI TEST RECEIVER	R&S	ESCI	100379	17-OCT-2013
LOOP ANTENNA	ETS-LINDGREN	6502	00102266	13-AUG-2013
BILOG ANTENNA	SCHAFFNER	CBL6112D	25229	12-SEP-2013
OPEN AREA TEST SITE	BVCPS	N/A	N/A	09-JUL-2013
ANECHOIC CHAMBER	ALBATROSS	M-CDC	80374004499B	30-NOV-2013
COAXIAL CABLE	SUHNER	N/A	N/A	24-SEP-2013

Remarks: -
N/A: Not Applicable or Not Available

The measurement instrumentation uncertainty would be taking into consideration on each of the test result

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Equipment Under Test [EUT]

Description of Sample:

Product:	RADIO CONTROL VEHICLES
Model No.:	61206
Power Supply:	9Vd.c. (“6F22” size battery x 1)

Description of EUT Operation:

The Equipment Under Test (EUT) is a GRANDEX INTERNATIONAL DEVELOPMENT LTD. of Radio Control toy. The transmitter is 2 sticks transmitter and operating at 27.145MHz. The EUT continues to transmit sticks are being pushed or pulled, Modulation by IC, and type is pulse modulation.

The transmitter has different control:

1. Left stick – control forward & backward
2. Right stick – control leftward & rightward

Antenna Requirement (Section 15.203)

The EUT is use of a permanently antenna. The antenna consists of 20cm long metal spring covered with rubber. The antenna is not replaceable or user serviceable. The requirements of S15.203 are met. There are no deviations or exceptions to the specifications.

Photo of Antenna

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Test Results

Radiated Emissions (Fundamental)

Test Requirement:	FCC Part 15 Section 15.227
Test Method:	ANSI C63.4
Test Date(s):	2013-03-28
Temperature:	23.0 °C
Humidity:	76.0 %
Atmospheric Pressure:	100.5 kPa
Mode of Operation:	Transmission mode
Tested Voltage:	9Vd.c. (“6F22” size battery x 1)

Test Method:

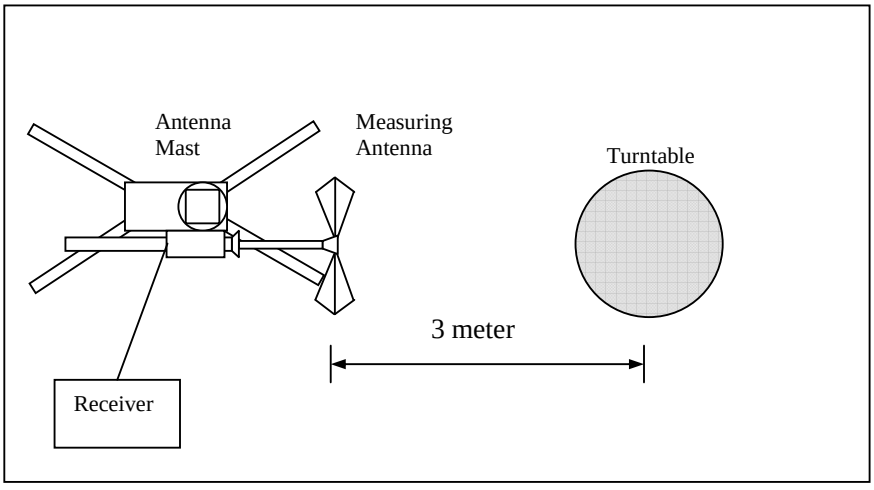
Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2009.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. 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, For battery operated equipment, the equipment tests shall be perform using new battery. The turntable was rotated to maximize the emission level. The antenna was then 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.

For below 30MHz, a loop antenna with its vertical plane is place 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 1m above the ground.

Location: The Roof, Westin Centre, 26 Hung To Road, Kwun Tong, Kowloon, Hong Kong

Test Setup: Open Area Test Site



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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.227]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [μV/m]	Field Strength of Fundamental Emission [Average] [μV/m]
26.96 – 27.28	100,000 (100 dBμV/m)	10,000 (80 dBμV/m)

Measurement Data

Test Result of (Transmission mode): PASS

Detection mode: Peak

Frequency (MHz)	Polarity (H/V) and degree	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
27.145	V/0°	11.0	48.7	100	-51.3

Detection mode: # Average

Frequency (MHz)	Polarity (H/V) and degree	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
27.145	V/0°	11.0	**44.5	80	-35.5

 # For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.
****Duty Cycle Correction = 20Log(0.62) =-4.2dB**

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 100KHz
VBW = 300KHz

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Radiated Emissions (9kHz – 1GHz)

Test Requirement:	FCC Part 15 Section 15.209
Test Method:	ANSI C63.4
Test Date(s):	2013-03-28
Temperature:	23.0 °C
Humidity:	76.0 %
Atmospheric Pressure:	100.5 kPa
Mode of Operation:	Transmission mode
Tested Voltage:	9Vd.c. (“6F22” size battery x 1)

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
1.705-30	300
30-88	100
88-216	150
216-960	200
Above960	500

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Measurement Data

Test Result of (Transmission mode): PASS

Detection mode: Quasi-Peak

Frequency (MHz)	Polarity (H/V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
54.290	H	8.2	20.2	40.0	-19.8
81.435	H	7.1	20.9	40.0	-19.1
108.580	H	12.6	21.2	43.5	-22.3
135.725	H	12.2	20.6	43.5	-22.9
162.870	H	9.6	20.3	43.5	-23.2
190.015	H	9.6	22.5	43.5	-21.0
217.160	H	10.3	20.9	46.0	-25.1
244.305	H	12.3	26.8	46.0	-19.2
271.450	H	13.2	25.3	46.0	-20.7
298.595	H	13.6	29.1	46.0	-16.9
325.740	H	15.1	31.6	46.0	-14.4
352.885	H	15.7	35.2	46.0	-10.8

Frequency (MHz)	Polarity (H/V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
54.290	V	8.2	20.3	40.0	-19.7
81.435	V	7.1	20.7	40.0	-19.3
108.580	V	12.6	20.5	43.5	-23.0
135.725	V	12.2	21.0	43.5	-22.5
162.870	V	9.6	20.8	43.5	-22.7
190.015	V	9.6	21.6	43.5	-21.9
217.160	V	10.3	21.3	46.0	-24.7
244.305	V	12.3	25.7	46.0	-20.3
271.450	V	13.2	24.2	46.0	-21.8
298.595	V	13.6	26.0	46.0	-20.0
325.740	V	15.1	28.9	46.0	-17.1
352.885	V	15.7	32.0	46.0	-14.0

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 120KHz
VBW = 120KHz

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26dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.227
Test Method:	ANSI C63.4
Test Date(s):	2013-03-06
Temperature:	23.0 °C
Humidity:	52.0 %
Atmospheric Pressure:	101.2 kPa
Mode of Operation:	Transmission mode
Tested Voltage:	9Vd.c. (“6F22” size battery x 1)

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.

Limits for 26dB Bandwidth of Fundamental Emission:

Frequency [MHz]	26dB Bandwidth [KHz]	Limits [MHz]
27.14688	93.44	within 26.96 – 27.28

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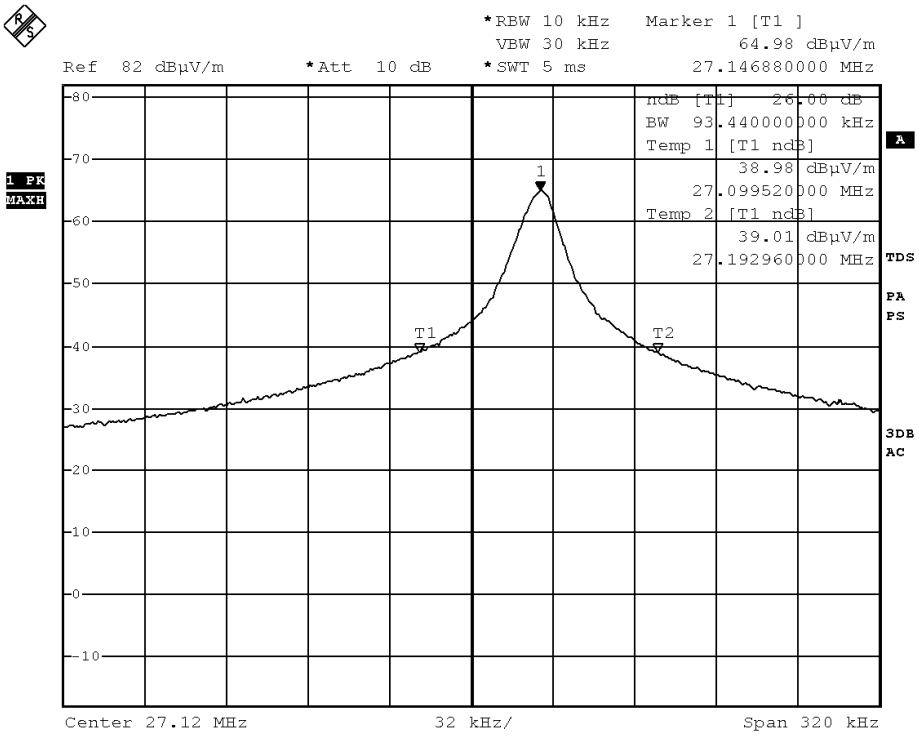
Measurement Data

Test Result of 26dB Bandwidth of Fundamental Emission: PASS



Date: 6.MAR.2013 09:23:27

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Duty Cycle Correction During 100msec:

Each function key sends a different series of characters, but each packet period (17.1msec) never exceeds a series of 4 long (1.4msec) and 10 short (0.5msec) pulses. Assuming any combination of short and long pulses maybe obtained due to encoding the worst case transmit duty cycle would be considered (4x1.4msec)+(10x0.5msec) per 17.1msec = 62.0% duty cycle. Figure A through C shows the characteristics of the pulse train for one of these functions.

Remarks: -

Duty Cycle Correction = 20Log(0.62) = -4.2dB

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

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Figure A [Pulse Train]

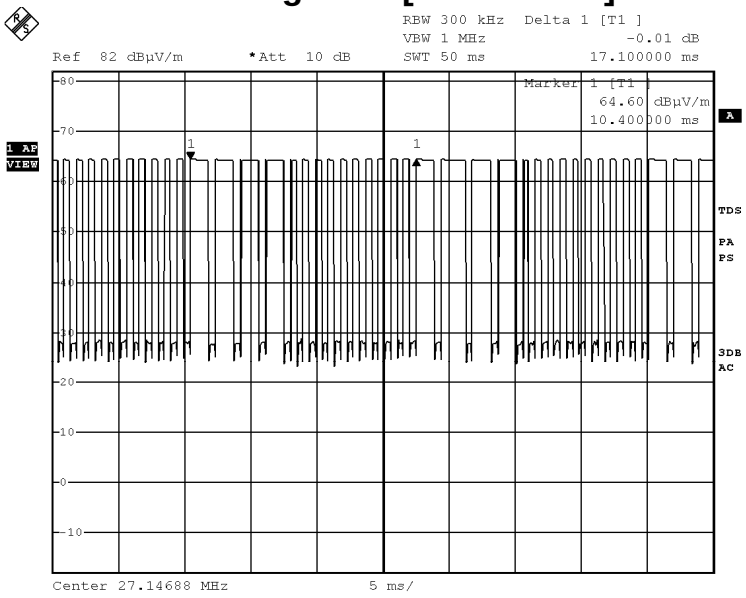

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Figure B [Long Pulse]

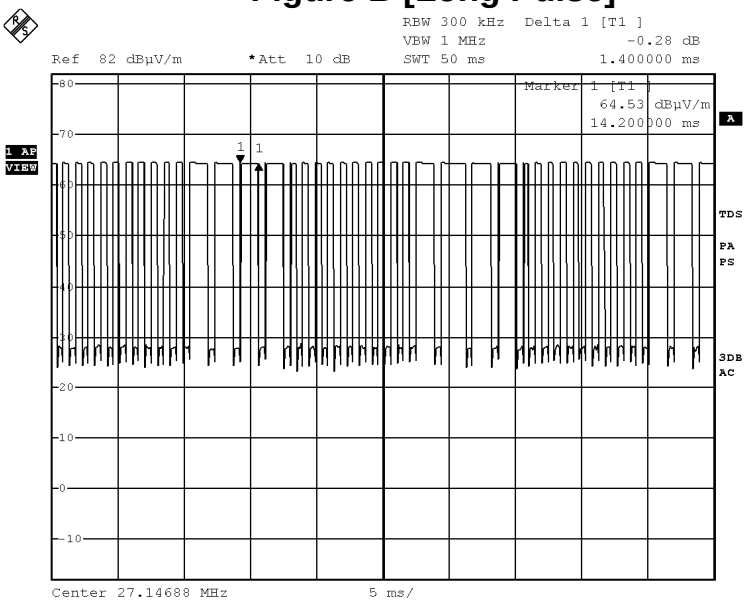

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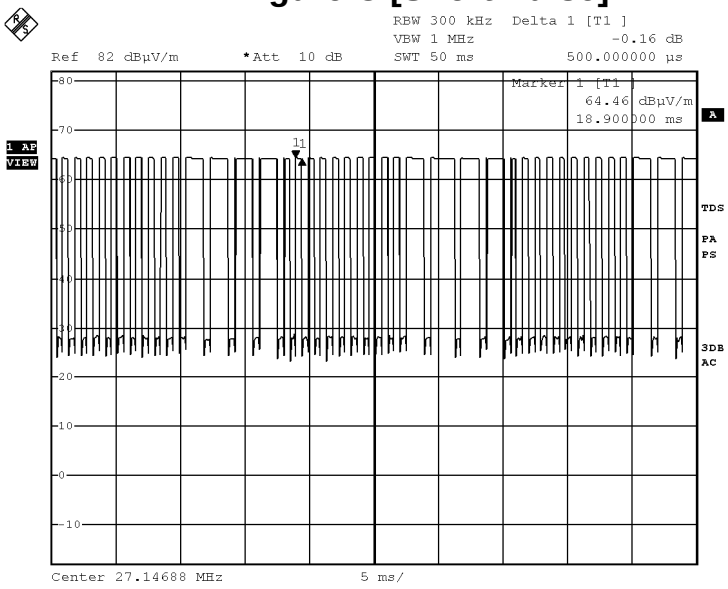
Figure C [Short Pulse]



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Photographs of EUT

Front View of the product

Rear View of the product

Battery compartment

Battery Cover

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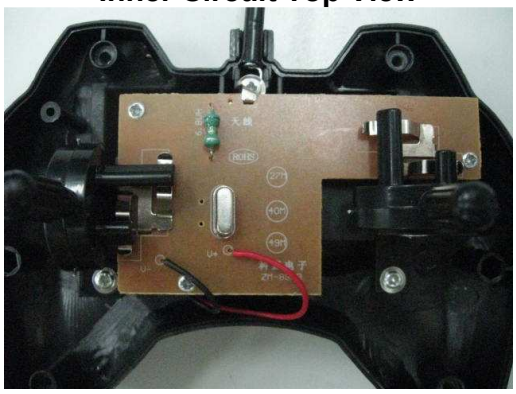
Photographs of EUT

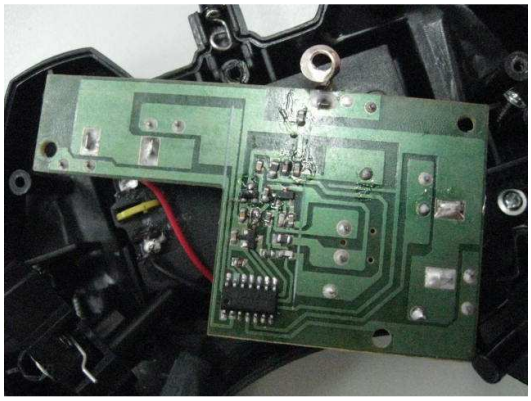
Front View of the product (Internal)

Rear View of the product (Internal)

Inner Circuit Top View



Inner Circuit Bottom View



Antenna

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Measurement of Radiated Emission Test Set Up

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

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