




TEST REPORT No.: (5214)020-1645

TEST REPORT

To:	NEW BRIGHT INDUSTRIAL CO., LTD	To:	-
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Folder No.:	NBT-14JA129MTHS-B-A		
Factory Name:	NEW BRIGHT INDUSTRIAL CO., LTD		
Location:	9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD, KOWLOON BAY, KOWLOON, HONG KONG		
Product:	Radio Control Toy Transmitter MODEL: G6DG21H2-2		
		Sample No:	HK140114/020
		Test date:	January 22, 2014
		Test Requested:	FCC Part 15 – 2012
		Test Method:	ANSI C63.4 – 2009
		FCC ID:	G6DG21H2-2
The results given in this report are related to the tested specimen of the described electrical apparatus.			
CONCLUSION: The submitted sample was found to <u>COMPLY</u> with requirement of FCC Part 15 Subpart C.			
Authorized Signature:			
			
Reviewed by: Keith Yeung		Approved by: Steven Tsang	
Date: January 24, 2014		Date: January 24, 2014	

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This report is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. Our report is limited to the test samples identified herein. The results set forth in this report are not necessarily indicative or representative of the statistical quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof. You shall have thirty days from receipt of this report to request additional testing of the samples or to notify us of any errors or omissions relating to our report, provided, however, such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



TEST REPORT No.: (5214)020-1645

Test Result Summary

EMISSION TEST			
Test requirement: FCC Part 15 - 2012			
Test Condition	Test Method	Test Result	
		Pass	Failed
Radiated Emission Test, 9kHz to 1GHz	ANSI C63.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Frequency range of Fundamental Emission	ANSI C63.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>
26dB Bandwidth of Fundamental Emission	ANSI C63.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Duty Cycle Correction During 100mesc	ANSI C63.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Report Revision & Sample Re-submit History:

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TEST REPORT No.: (5214)020-1645

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	28-JAN-2014
SIGNAL ANALYER 40GHZ	R&S	FSV 40	100977	22-Dec-2014
LOOP ANTENNA	ETS-LINDGREN	6502	00102266	20-OCT-2014
BILOG ANTENNA	SCHAFFNER	CBL6112D	25229	20-OCT-2014
OPEN AREA TEST SITE	BVCPS	N/A	N/A	11-SEP-2014
ANECHOIC CHAMBER	ALBATROSS	M-CDC	80374004499B	08-JUL-2014
COAXIAL CABLE	SUHNER	RG214	N/A	05-FEB-2014

Remarks: -

N/A: Not Applicable or Not Available

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

TEST REPORT No.: (5214)020-1645

Equipment Under Test [EUT]

Description of Sample:

Product:	Radio Control Toy Transmitter
Model No.:	G6DG21H2-2
Additional Model Name:	--
Additional Model Number:	--
Additional Model Information:	--
Power Supply:	3Vd.c. ("AA" size battery x 2)

Description of EUT Operation:

The Equipment Under Test (EUT) is a NEW BRIGHT INDUSTRIAL CO., LTD of Radio Control toy. It is 2 sticks, 2 buttons and operating at 27.147MHz transmitter. The EUT continues to transmit while sticks are being pushed or pulled, Modulation by IC, and type is pulse modulation.

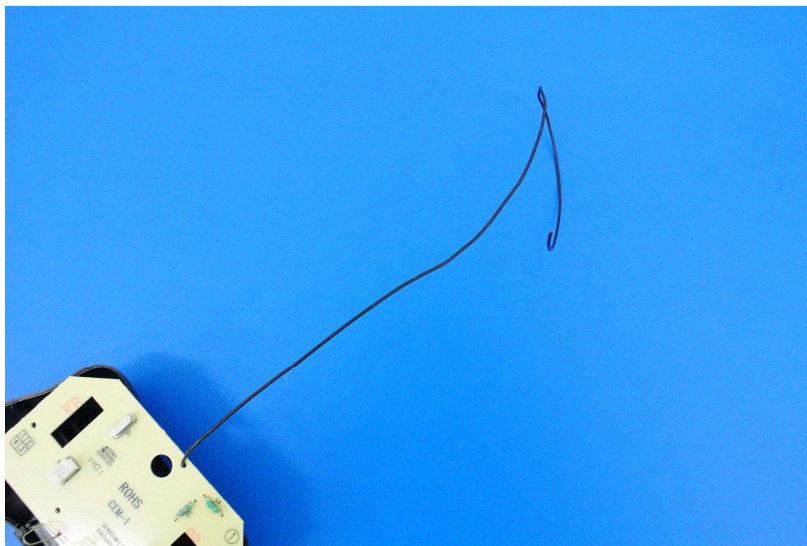
The transmitter has different control:

1. Left stick – control forward and backward
2. Right stick – control leftward and rightward
3. Left button – turn on or off the sounds
4. Right button – press to active the horn sound

Antenna Requirement (Section 15.203)

The EUT is use of a permanently antenna. The antenna consists of 32cm long wire. It is soldered on the PCB. 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



TEST REPORT No.: (5214)020-1645

Test Results

Radiated Emissions (Fundamental)

Test Requirement: FCC Part 15 Section 15.227
Test Method: ANSI C63.4
Test Date(s): 2014-01-21
Temperature: 14.0 °C
Humidity: 35.0 %
Atmospheric Pressure: 101.3 kPa
Mode of Operation: Transmission mode
Tested Voltage: 3Vd.c. ("AA" size battery x 2)

Test Method:

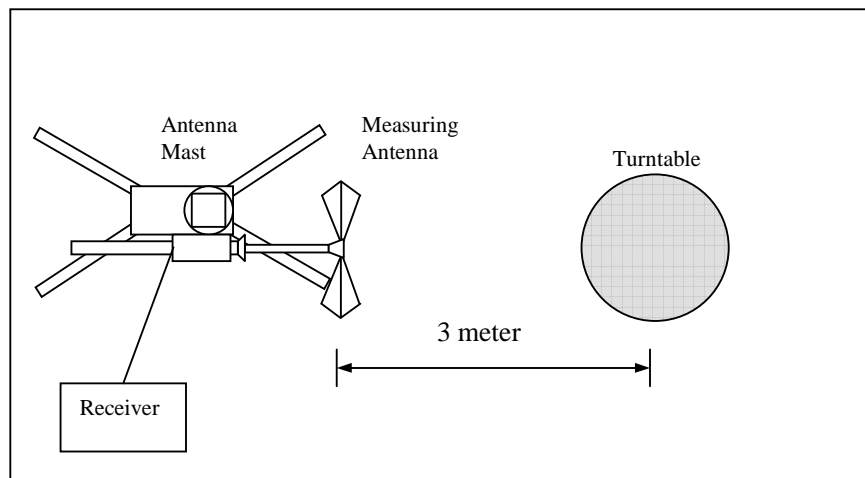
Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2009.

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





TEST REPORT No.: (5214)020-1645

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)
27.147	V/0°	11.0	55.5	100.0	-44.5

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)
27.147	V/0°	11.0	**35.5	80.0	-44.5

For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

**Duty Cycle Correction = $20\log(0.0464) = -26.7\text{dB}$

Therefore, -20dB is taken

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 100KHz
VBW = 300KHz



TEST REPORT No.: (5214)020-1645

Radiated Emissions (9kHz – 1GHz)

Test Requirement: FCC Part 15 Section 15.209
Test Method: ANSI C63.4

Test Date(s): 2014-01-21
Temperature: 14.0 °C
Humidity: 35.0 %
Atmospheric Pressure: 101.3 kPa

Mode of Operation: Transmission mode
Tested Voltage: 3Vd.c. ("AA" size battery x 2)

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]	Measurement Distance m
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3



TEST REPORT No.: (5214)020-1645

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)
54.294	H	12.2	32.1	40.0	-7.9
81.441	H	7.9	19.9	40.0	-20.1
108.588	H	12.3	24.5	43.5	-19.0
135.735	H	13.3	25.0	43.5	-18.5
162.882	H	11.5	24.1	43.5	-19.4
190.029	H	11.5	23.8	43.5	-19.7
217.176	H	13.0	25.3	46.0	-20.7
244.323	H	13.6	27.6	46.0	-18.4
271.470	H	14.1	26.0	46.0	-20.0
298.617	H	14.5	32.7	46.0	-13.3

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)
54.294	V	12.2	30.5	40.0	-9.5
81.441	V	7.9	19.3	40.0	-20.7
108.588	V	12.3	21.6	43.5	-21.9
135.735	V	13.3	25.6	43.5	-17.9
162.882	V	11.5	23.8	43.5	-19.7
190.029	V	11.5	22.5	43.5	-21.0
217.176	V	13.0	27.4	46.0	-18.6
244.323	V	13.6	28.5	46.0	-17.5
271.470	V	14.1	27.6	46.0	-18.4
298.617	V	14.5	30.8	46.0	-15.2

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 120KHz
VBW = 120KHz



TEST REPORT No.: (5214)020-1645

26dB Bandwidth of Fundamental Emission

Test Requirement: FCC 47 CFR 15.227
Test Method: ANSI C63.4
Test Date(s): 2014-01-21
Temperature: 14.0 °C
Humidity: 35.0 %
Atmospheric Pressure: 101.3 kPa
Mode of Operation: Transmission mode
Tested Voltage: 3Vd.c. ("AA" size battery x 2)

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]
27.14732	100.03	within 26.96 – 27.28



TEST REPORT No.: (5214)020-1645

Duty Cycle Correction During 100msec:

Each function key sends a different series of characters, but each packet period (55.072msec) never exceeds a series of 1 long (623.2µsec), 2 middle (318.8µsec) and 9 short (144.9µsec) pulses. Assuming any combination of short and long pulses maybe obtained due to encoding the worst case transmit duty cycle would be considered $(2 \times 318.8\mu\text{sec}) + (9 \times 144.9\mu\text{sec}) + 623.2\mu\text{sec}$ per 55.072msec = 4.64% duty cycle. Figure A to Figure D show the characteristics of the pulse train for one of these functions.

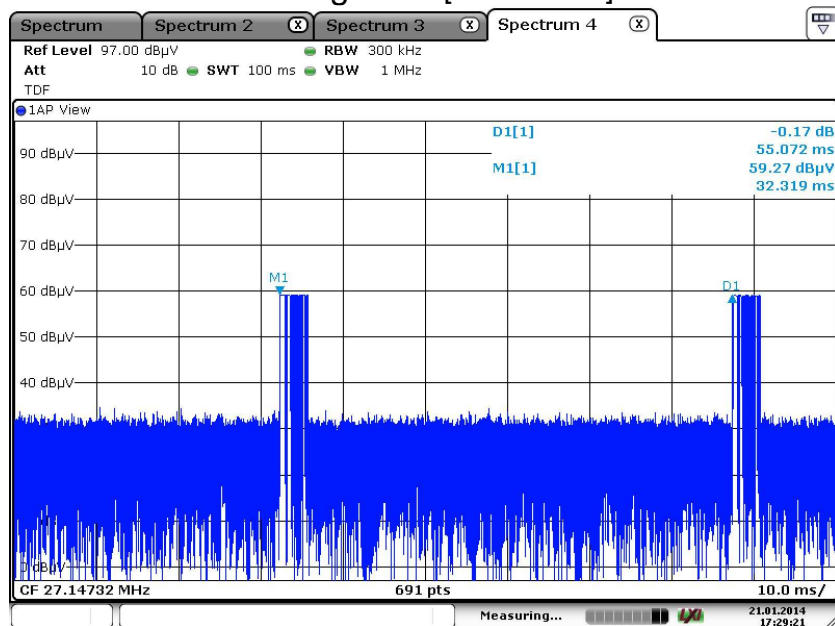
Remarks: -

Duty Cycle Correction = $20\text{Log}(0.464) = -26.7\text{dB}$
Therefore, -20dB is taken

The following figures (Figure A to Figure D) show the characteristics of the pulse train for one of these functions.

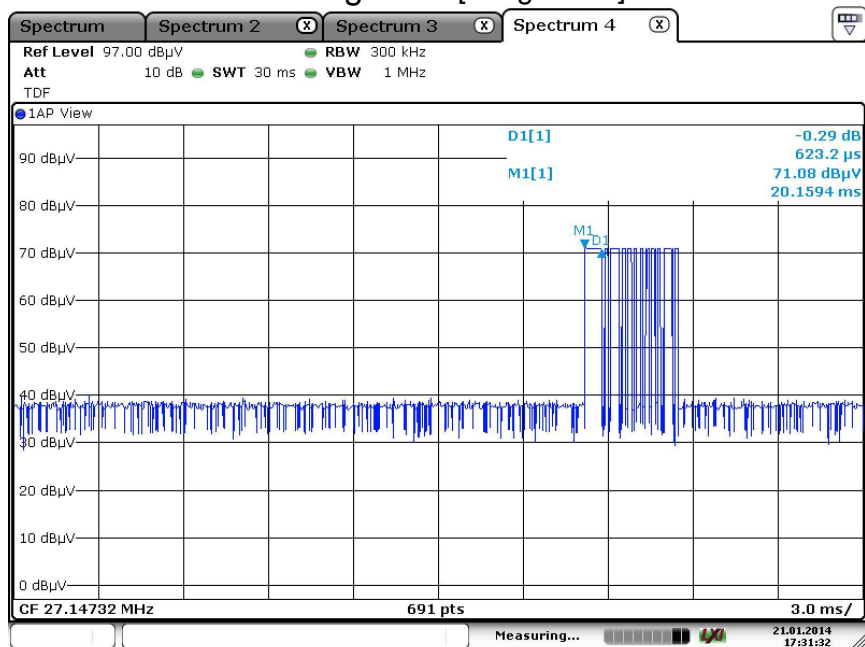
TEST REPORT No.: (5213)331-1368

Figure A [Pulse Train]



Date: 21.JAN.2014 17:29:21

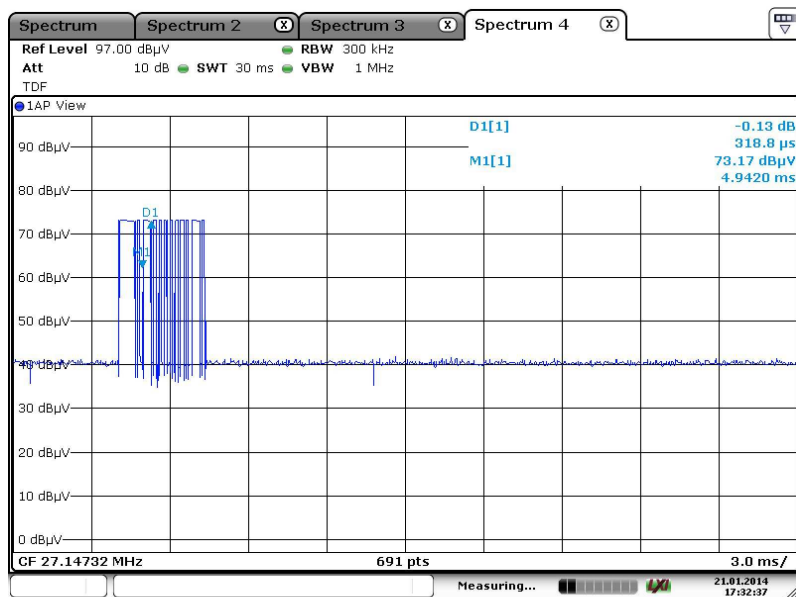
Figure B [Long Pulse]



Date: 21.JAN.2014 17:31:32

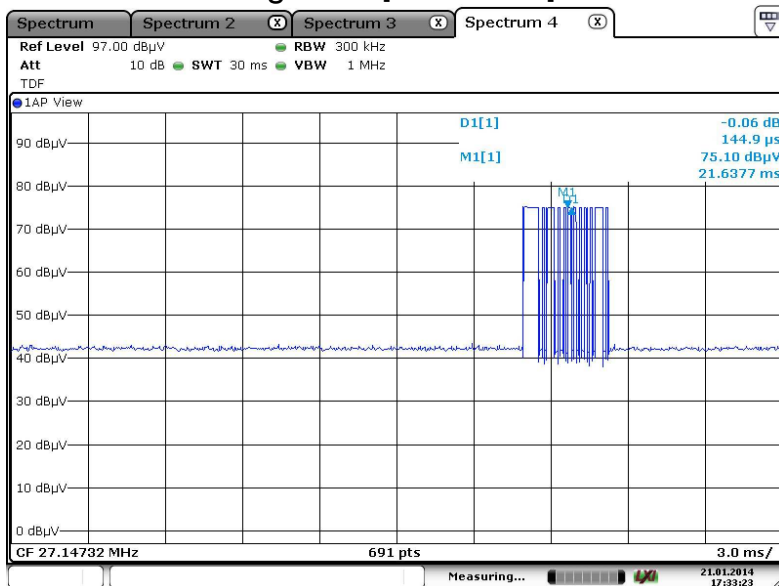
TEST REPORT No.: (5213)331-1368

Figure C [Short Pulse]



Date: 21.JAN.2014 17:32:37

Figure D [Short Pulse]



Date: 21.JAN.2014 17:33:23

TEST REPORT No.: (5213)331-1368
Photographs of EUT

Front View of the product



Rear View of the product



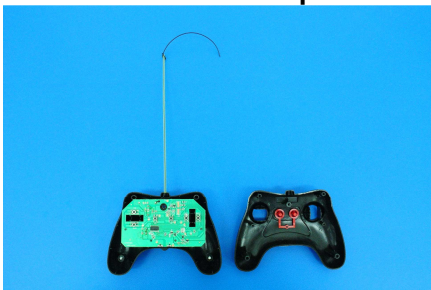
Battery compartment



Battery Cover



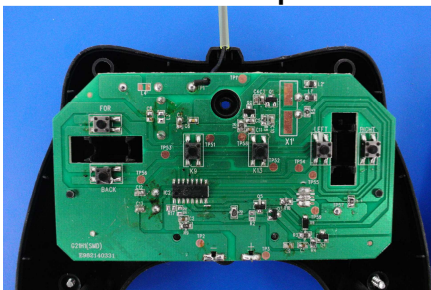
Internal View of the product



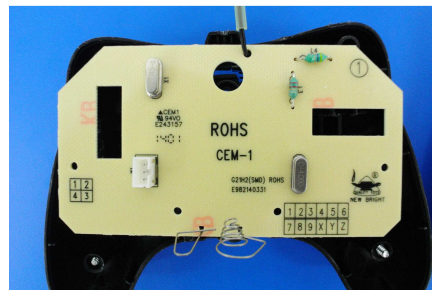
Internal View of the product



Inner Circuit Top View



Inner Circuit Bottom View



TEST REPORT No.: (5213)331-1368

Measurement of Radiated Emission Test Set Up



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