

TEST REPORT No.: (5219)180-0213

TEST REPORT

To: NKOK, Inc.	To: -
Attn: --	Attn: -
Address: 5354 Irwindale Ave Unit A Irwindale CA 91706	Address: -
Fax: 626-330-1199	Fax: -
E-mail: testing@nkok.com	E-mail: -
Folder No.: --	
Factory Name: --	
Location: --	
Product: RC Car MODEL: 88864	
	Sample No: (5219)180-0213
	Date of Receipt: July 09, 2019
	Test Date(s): August 09, 2019
	Test Requested: FCC Part 15 – 2017
	Test Method: ANSI C63.10 – 2013
	FCC ID: XQPLQ061927TX
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: Ivan Yeung	Approved by: Sze Tsz Man
Date: August 27, 2019	Date: August 27, 2019



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Test Result Summary

EMISSION TEST			
Test requirement: FCC Part 15 – 2017			
Test Condition	Test Method	Test Result	
		Pass	Failed
Radiated Emission Test, 9kHz to 1GHz	ANSI C63.10	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Frequency range of Fundamental Emission	ANSI C63.10	<input checked="" type="checkbox"/>	<input type="checkbox"/>
26dB Bandwidth of Fundamental Emission	ANSI C63.10	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Duty Cycle Correction During 100mesc	ANSI C63.10	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Report Revision & Sample Re-submit History:

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Location of the test laboratory

Bureau Veritas Hong Kong Limited

Room 03, 6/F, Westin Centre, 26 Hung To Road, Kwun Tong, Kowloon, Hong Kong

Radiated measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013. Semi-anechoic Chamber are set up for investigation and located at:

LG1/F., HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong

List of measuring equipment

Radiated Emission

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE	CAL. DUE DATE
EMI TEST RECEIVER	R&S	ESU40	100190	12-JUN-2019	12-JUN-2020
SEMI-ANECHOIC CHAMBER	FRANKONIA	--	--	23-APR-2019	23-APR-2020
BICONICAL ANTENNA	R&S	HK116	100241	21-MAR-2018	21-MAR-2020
LOG-PERIODIC ANTENNA	R&S	HL223	841516/017	21-MAR-2018	21-MAR-2020
ACTIVE LOOP ANTENNA	EMCO	6502	9107-2651	30-OCT-2017	30-OCT-2019
STANDARD GAIN HORN (8.2 – 12.4GHZ)	ETS-LINDGREN	3160-07	00205404	04-SEP-2018	04-SEP-2020
STANDARD GAIN HORN (12.4 – 18GHZ)	ETS-LINDGREN	3160-08	002056363	26-SEP-2018	26-SEP-2020
DOUBLE RIDGED HORN (1 – 8.2GHZ)	ETS-LINDGREN	3117	00094998	30-AUG-2018	30-AUG-2020
STANDARD GAIN HORN (26.5 – 40GHZ)	ETS-LINDGREN	3160-10	00205696	03-OCT-2018	03-OCT-2020
DOUBLE RIDGED HORN (18-26.5GHZ)	ETS-LINDGREN	3116	00109210	05-OCT-2018	05-OCT-2020
MICROWAVE PREAMPLIFIER	COM-POWER CORPORATION	PAM-118A	551091	25-JUN-2019	25-JUN-2020
PREAMPLIFIER (18 -40GHZ WITH CABLE)	A.H. Systems, Inc.	Pam-1840VH	168	29-JAN-2019	29-JAN-2020
COAXIAL CABLE	Huber+Suhner	CNM-NMCMILX800-473	A2803 #0001	11-DEC-2017	11-DEC-2019

Measurement Uncertainty:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	30MHz to 200MHz	±5.1dB
	200MHz to 1GHz	±6.2dB
	1GHz to 8.2GHz	±4.9dB
	8.2GHz to 12.4GHz	±4.4dB
	12.4GHz to 18GHz	±4.6dB

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:

Model Name: RC Car
Model Number: 88864
Additional Model Name: --
Additional Model Number: --
Additional Model information: --
Rating: 3Vd.c. ("AAA" size battery x 2)

Description of EUT Operation:

The Equipment Under Test (EUT) is a **NKOK, Inc.** of Radio Control toy. The transmitter is 2 sticks and operating at 27.145MHz. 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 – Left motor control
2. Right stick – right motor control

Antenna Requirement (Section 15.203)

The EUT is use of a permanently antenna. The antenna consists of 21cm 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 C63.10 Clause 6.5
Test Date(s):	2019-08-09
Temperature:	25.0 °C
Humidity:	60.0 %
Mode of Operation:	Transmission mode
Tested Voltage:	3Vd.c. ("AAA" size battery x 2)

Test Method:

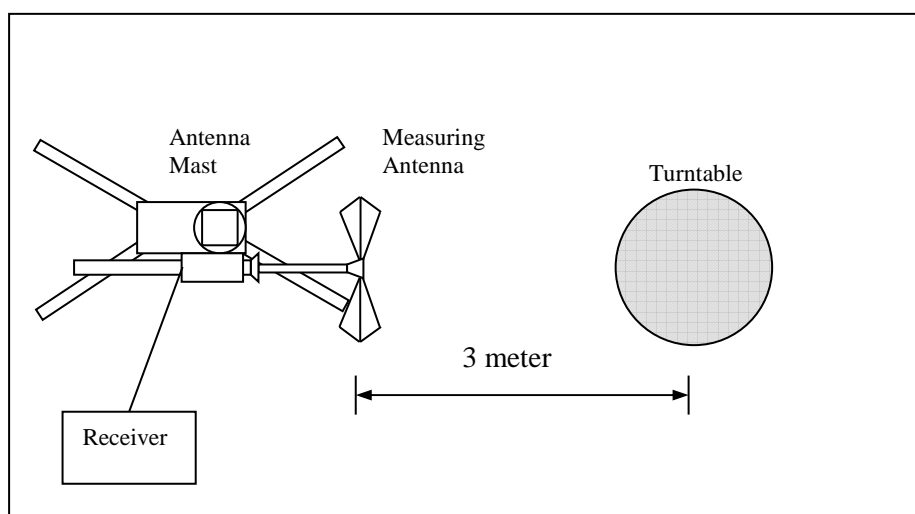
Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013.

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 for measurement frequency below 1GHz and 1.5m high above the ground for measurement frequency above 1GHz. 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: Hong Kong Productivity Council – Electromagnetic Compatibility Centre

Test Setup: Semi-anechoic chamber





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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	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
27.145	V	72.6	100.0	-27.4

Detection mode: #Average

Frequency (MHz)	Polarity (H/V) and degree	**Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
27.145	V	68.7	80.0	-11.3

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

** Duty Cycle Correction = $20\text{Log}(0.6347) = -3.9\text{dB}$

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 C63.10 Clause 6.5
 Test Date(s): 2019-08-09
 Temperature: 25.0 °C
 Humidity: 60.0 %
 Mode of Operation: Transmission mode
 Tested Voltage: 3Vd.c. ("AAA" size battery x 2)

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V}/\text{m}$]	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
Above960	500	3

Measurement Data

Test Result of (Transmission mode): PASS

Detection mode: Quasi-Peak

Frequency	Polarity (H/V)	Field Strength	Limit	Margin (dB)
Emissions detected are more than 20 dB below the limit line(s) in 9kHz to 30MHz				



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Measurement Data

Test Result of (Transmission mode): **PASS**

Detection mode: Quasi-Peak

Frequency (MHz)	Polarity (H/V)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
54.290	H	9.4	40.0	-30.6
81.435	H	7.1	40.0	-32.9
108.580	H	8.0	43.5	-35.5
135.725	H	9.7	43.5	-33.8
162.870	H	12.1	43.5	-31.4
190.015	H	12.6	43.5	-30.9
217.160	H	9.5	46.0	-36.5
244.305	H	10.0	46.0	-36.0
271.450	H	11.0	46.0	-35.0
298.595	H	11.8	46.0	-34.2

Frequency (MHz)	Polarity (H/V)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
54.290	V	26.6	40.0	-13.4
81.435	V	13.6	40.0	-26.4
108.580	V	11.3	43.5	-32.2
135.725	V	13.5	43.5	-30.0
162.870	V	14.2	43.5	-29.3
190.015	V	12.9	43.5	-30.6
217.160	V	12.2	46.0	-33.8
244.305	V	10.6	46.0	-35.4
271.450	V	11.6	46.0	-34.4
298.595	V	12.3	46.0	-33.7

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 C63.10 Clause 6.10
Test Date(s): 2019-08-09
Temperature: 25.0 °C
Humidity: 60.0 %
Mode of Operation: Transmission mode
Tested Voltage: 3Vd.c. ("AAA" 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.

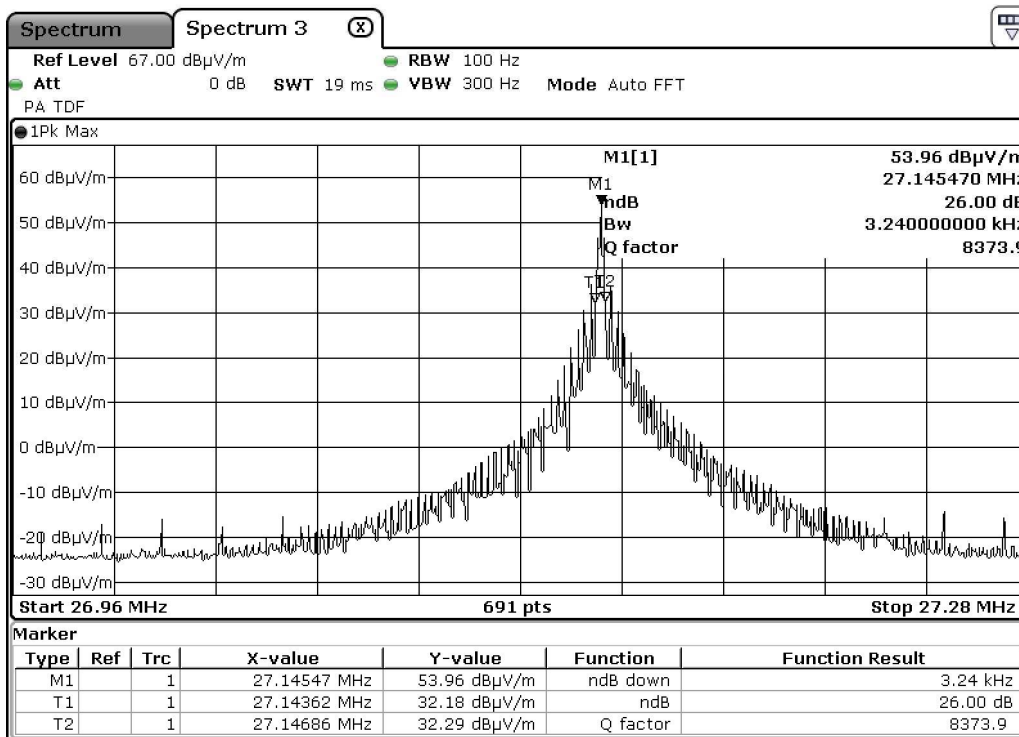
Limits for 26dB Bandwidth of Fundamental Emission:

Frequency [MHz]	26dB Bandwidth [KHz]	Limits [MHz]
27.14547	3.24	within 26.96-27.28

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Measurement Data

Test Result of 26dB Bandwidth of Fundamental Emission: PASS





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Duty Cycle Correction During 100msec:

Each function key sends a different series of characters, but each packet period (100msec) never exceeds a series of 22 long (1.304msec) and 60 short (0.5797msec) pulses. Assuming any combination of short and long pulses maybe obtained due to encoding the worst case transmit duty cycle would be considered $(22 \times 1.304 \text{msec}) + (60 \times 0.5797 \text{msec})$ per 100msec = 63.47% duty cycle.

Remarks: -

Duty Cycle Correction = $20 \log(0.6347) = -3.9 \text{dB}$

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

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Figure A [Long Pulse]

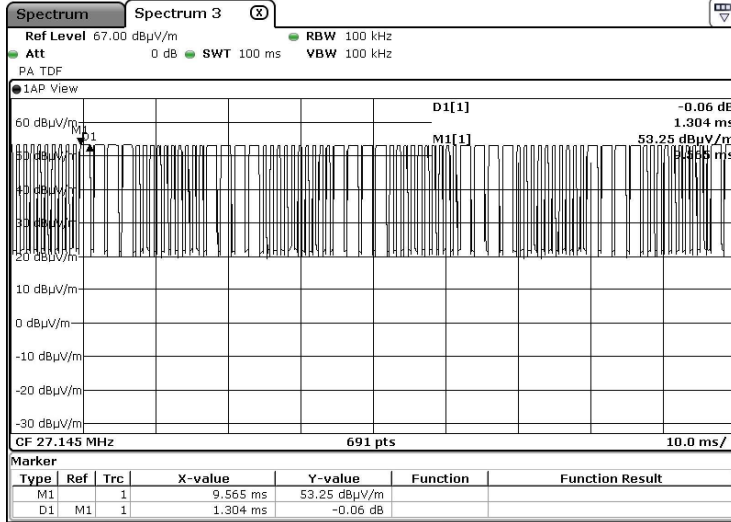
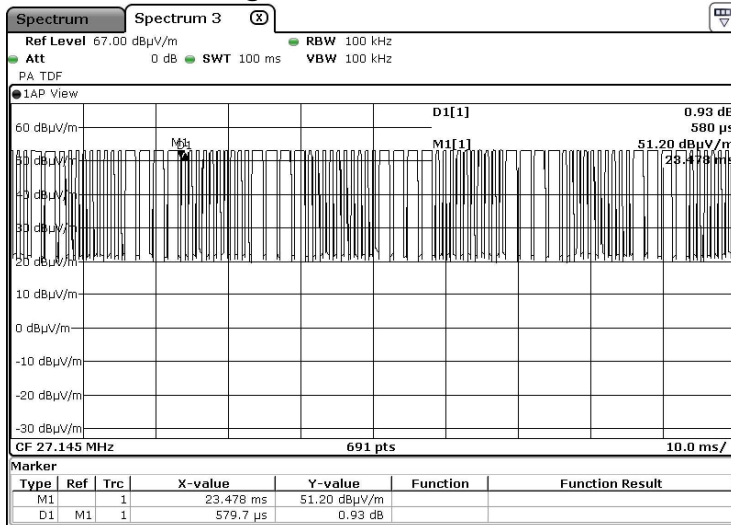


Figure B [Short Pulse]



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Photographs of EUT

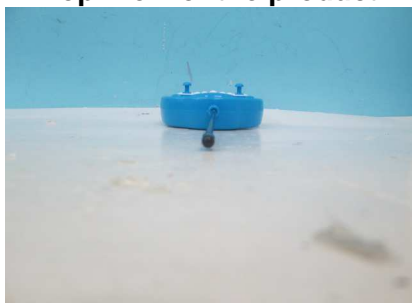
Front View of the product



Rear View of the product



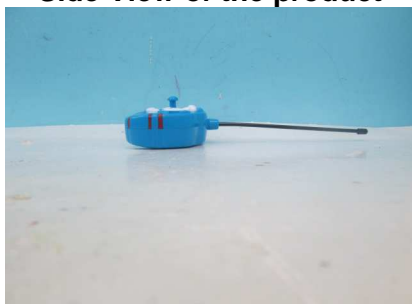
Top View of the product



Bottom View of the product



Side View of the product



Side View of the product



Battery compartment



Battery Cover



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Photographs of EUT

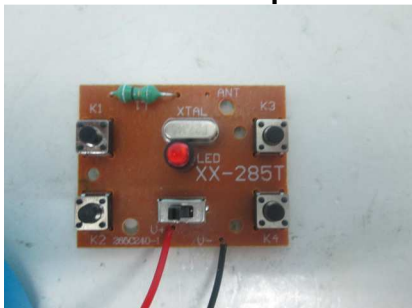
Internal View of the product



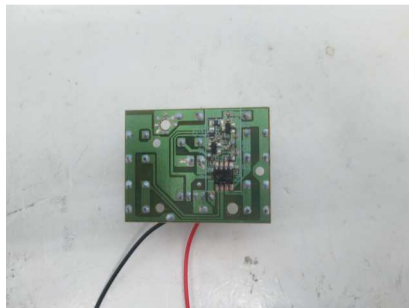
Internal View of the product



Inner Circuit Top View



Inner Circuit Bottom View



Antenna



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Measurement of Radiated Emission Test Set Up



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