




TEST REPORT No: (5211)158-1440

## TEST REPORT

|   |   |  |   |
|---|---|--|---|
| To:   | <b>NKOK, INC.</b>   | To:  | - |
| Attn:   | Lanny Halim   | Attn:  | - |
| Address:  | 13668 E Valley Blvd G2 City of Industry<br>CA 91746   | Address:   | - |
| Fax:  | 626-330-1199  | Fax:   | - |
| E-mail:   | <a href="mailto:kohsche@nkok.com">kohsche@nkok.com</a> / <a href="mailto:lanny@nkok.com">lanny@nkok.com</a>   | E-mail:  | - |
| Folder No.:   | BVCK11JU159MTHS-B   |  |   |
| Factory name:   | <b>NKOK, INC.</b>   |  |   |
| Location:   | --  |  |   |
| Product:  | <b>R/C HALO MONGOOSE<br/>MODEL: 702 (Assortment No.: 700)</b>   |  |   |
|   | Sample No:  | (5211)158-1440   |   |
|   | Test date:  | June 22, 2011  |   |
|   | Test Requested:   | FCC Part 15 - 2010   |   |
|   | Test Method:  | ANSI C63.4 - 2003  |   |
|   | FCC ID:   | XQPNK041149TX  |   |
|   | <p>The results given in this report are related to the tested specimen of the described electrical apparatus.</p> <p><b>CONCLUSION: The submitted sample was found to COMPLY with requirement of FCC Part 15 Subpart C.</b></p> |  |   |
| Authorized Signature:   |   |  |   |
|  |   |  |   |
| Reviewed by: Keith Yeung  |   | Approved by: Steven Tsang  |   |
| Date: July 19, 2011   |   | Date: July 19, 2011  |   |



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### Location of the test laboratory

Radiated and Conducted emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003. 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

### List of measuring equipment

#### Radiated Emission

| EQUIPMENT           | MANUFACTURER | MODEL NO. | SERIAL NO.   | CALIBRATION DUE |
|---------------------|--------------|-----------|--------------|-----------------|
| EMI TEST RECEIVER   | R&S          | ESCI      | 100379       | 06-SEP-2011     |
| BILOG ANTENNA       | SCHAFFNER    | CBL6112D  | 25229        | 02-AUG-2011     |
| OPEN AREA TEST SITE | BVCPS        | N/A       | N/A          | 05-JUL-2011     |
| ANECHOIC CHAMBER    | ALBATROSS    | M-CDC     | 80374004499B | 26-OCT-2011     |
| COAXIAL CABLE       | SUHNER       | N/A       | N/A          | 19-SEP-2011     |

#### 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: (5211)158-1440

### Equipment Under Test [EUT]

#### Description of Sample:

Model Name: R/C HALO MONGOOSE  
Model Number: 702 (Assortment No.: 700)  
Additional Product Name: R/C HALO WARTHOG / R/C HALO ARCTIC WARTHOG /  
R/C HALO ROCKET WARTHOG / R/C HALO ARCTIC MONGOOSE  
Additional Model No.: 701 / 701A / 701R / 702A (Assortment No.: 700)  
Additional Model Information: Declare the Circuit, PCB layout and Electrical parts of the products  
are identical to the basic model, except the colour/shape of car body.  
Rating: 9Vd.c. ("6F22" size battery x 1)

#### Description of EUT Operation:

The Equipment Under Test (EUT) is a NKOK, INC of Radio Control toy. It is a 2 buttons & 1 switch transmitter and operating at 49.86MHz. The EUT continues to transmit buttons is being pressed, Modulation by IC, and type is pulse modulation.

The transmitter has different control:

1. Left button – Forward and Backward control
2. Right button – Leftward and Rightward control
3. On/Off switch – On and Off control

#### Antenna Requirement (Section 15.203)

The EUT is use of a screw-on type antenna. The antenna consists of 31cm long metal antenna. The antenna connector is custom-made and not be able to found in the market. It also cannot be replaced with other antenna other then the one bundled inside the package. The requirements of S15.203 are met. There are no deviations or exceptions to the specifications.

**Photo of Antenna**



**TEST REPORT No: (5211)158-1440**

**Radiated Emissions (Fundamental)**

Test Requirement: FCC Part 15 Section 15.235  
 Test Method: ANSI C63.4  
 Test Date(s): 2011-06-22  
 Temperature: 27.0 °C  
 Humidity: 87.0 %  
 Atmospheric Pressure: 100.3 kPa  
 Mode of Operation: Transmission mode  
 Tested Voltage: 9Vd.c. ("6F22" size battery x 1)

**Test Procedure:**

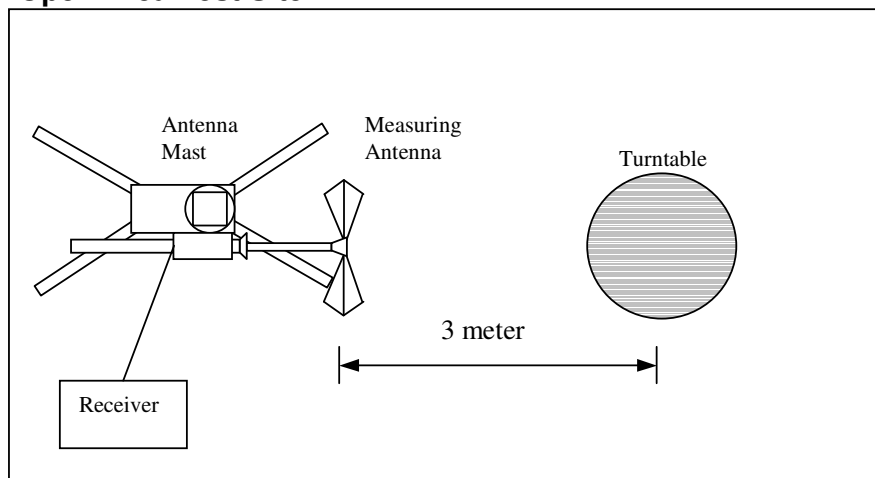
Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003.

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 15.235]:**

| Frequency Range of Fundamental<br>[MHz] | Field Strength of Fundamental Emission<br>[Peak]<br>[μV/m] | Field Strength of Fundamental Emission<br>[Average]<br>[μV/m] |
|---|--|---|
| 49.82 – 49.90                           | 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) |
|-----------------|---------------------------|--------------------------------------|-------------------------------|----------------------|-------------|
| 49.86           | H                         | 7.8                                  | 65.8                          | 100                  | -34.2       |

**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) |
|-----------------|---------------------------|--------------------------------------|-------------------------------|----------------------|-------------|
| 49.86           | H                         | 7.8                                  | **61.4                        | 80                   | -18.6       |

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

\*\*Duty Cycle Correction =  $20\log(0.601) = -4.4\text{dB}$

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 100KHz  
VBW = 300KHz



## TEST REPORT No: (5211)158-1440

### Radiated Emissions (9kHz – 1GHz)

Test Requirement: FCC Part 15 Section 15.209  
Test Method: ANSI C63.4  
Test Date(s): 2011-06-22  
Temperature: 27.0 °C  
Humidity: 87.0 %  
Atmospheric Pressure: 100.3 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<br>[MHz] | Quasi-Peak Limits<br>[ $\mu$ V/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) | Field Strength at 3m (dB $\mu$ V/m) | Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|-----------------|----------------|-------------------------------------|----------------------------|-------------|
| 99.72           | H              | 23.7                                | 43.5                       | -19.8       |
| 149.58          | H              | 21.9                                | 43.5                       | -21.6       |
| 199.44          | H              | 22.6                                | 43.5                       | -20.9       |
| 249.30          | H              | 23.4                                | 46.0                       | -22.6       |
| 299.16          | H              | 25.4                                | 46.0                       | -20.6       |
| 349.02          | H              | 26.1                                | 46.0                       | -19.9       |
| 398.88          | H              | 27.1                                | 46.0                       | -18.9       |
| 448.74          | H              | 29.4                                | 46.0                       | -16.6       |
| 498.60          | H              | 30.2                                | 46.0                       | -15.8       |
| 548.46          | H              | 31.6                                | 46.0                       | -14.4       |

| Frequency (MHz) | Polarity (H/V) | Field Strength at 3m (dB $\mu$ V/m) | Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|-----------------|----------------|-------------------------------------|----------------------------|-------------|
| 99.72           | V              | 28.4                                | 43.5                       | -15.1       |
| 149.58          | V              | 22.5                                | 43.5                       | -21.0       |
| 199.44          | V              | 21.8                                | 43.5                       | -21.7       |
| 249.30          | V              | 23.2                                | 46.0                       | -22.8       |
| 299.16          | V              | 25.5                                | 46.0                       | -20.5       |
| 349.02          | V              | 26.0                                | 46.0                       | -20.0       |
| 398.88          | V              | 27.2                                | 46.0                       | -18.8       |
| 448.74          | V              | 29.5                                | 46.0                       | -16.5       |
| 498.60          | V              | 30.3                                | 46.0                       | -15.7       |
| 548.46          | V              | 31.6                                | 46.0                       | -14.4       |

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 15.235  
 Test Method: ANSI C63.4:2003 (Section 13.1.7)  
 Test Date(s): 2011-06-22  
 Temperature: 27.0 °C  
 Humidity: 87.0 %  
 Atmospheric Pressure: 100.3 kPa  
 Mode of Operation: Transmission mode

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<br>[MHz] | 26dB Bandwidth<br>[KHz] | Limits<br>[MHz]    |
|--------------------|-------------------------|--------------------|
| 49.8608            | 95.6                    | within 49.82-49.90 |







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### Duty Cycle Correction During 100msec:

Each function key sends a different series of characters, but each packet period (18.3msec) never exceeds a series of 4 long (1.5msec) 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  $(4 \times 1.5\text{msec}) + (10 \times 0.5\text{msec})$  per 18.3msec = 60.1% duty cycle.

Figure A through C shows the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction =  $20\text{Log}(0.601) = -4.4\text{dB}$

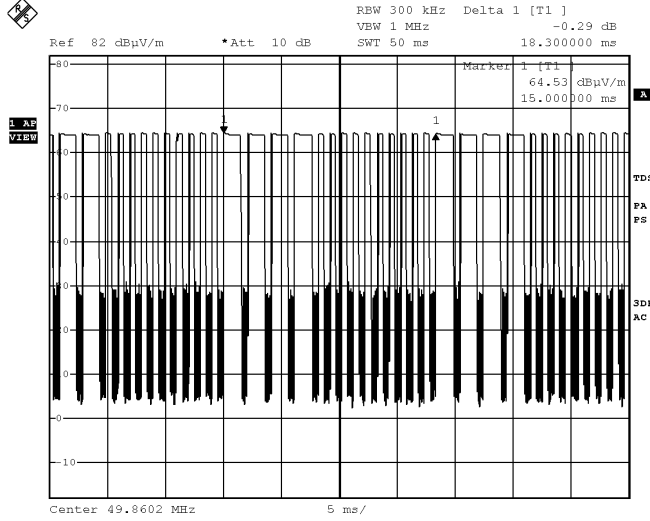
The following figures [Figure A to Figure C] show the characteristics of the pulse train for one of these functions.



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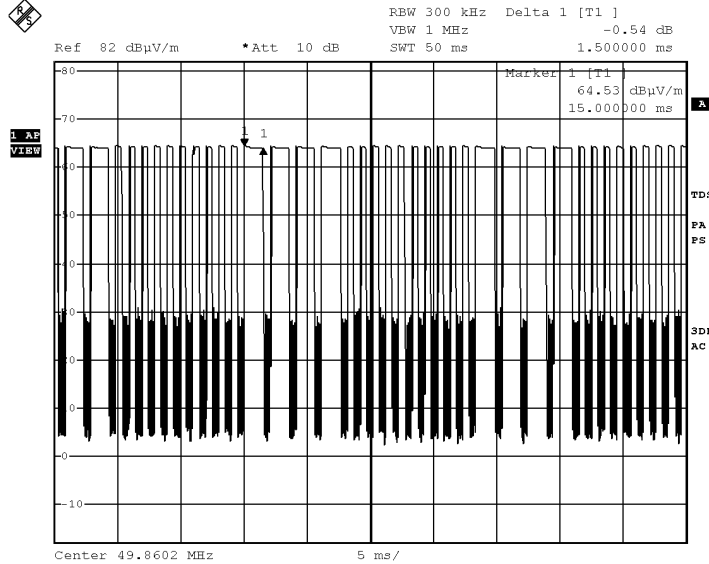
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Figure A [Pulse Train]



Date: 22.JUN.2011 14:40:30

Figure B [Long Pulse]



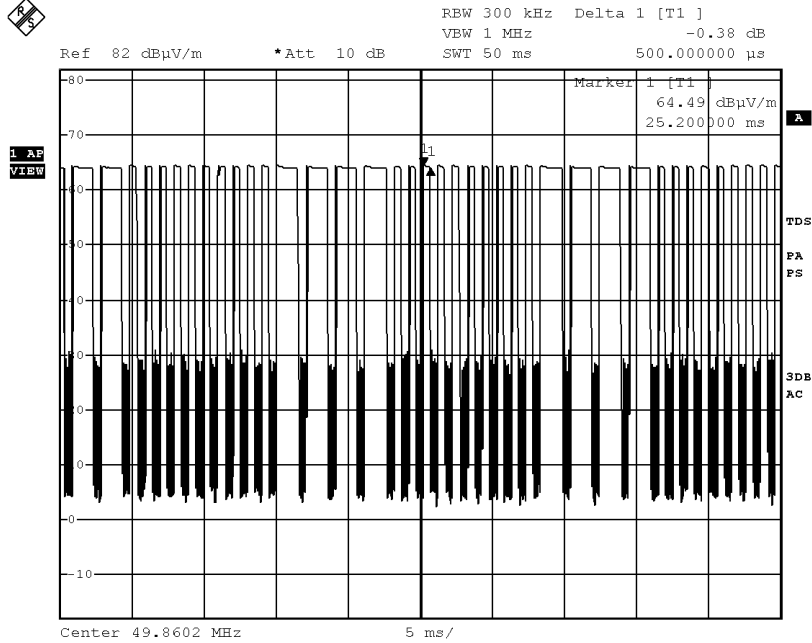
Date: 22.JUN.2011 14:40:43



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Figure C [Short Pulse]



Date: 22.JUN.2011 14:41:20

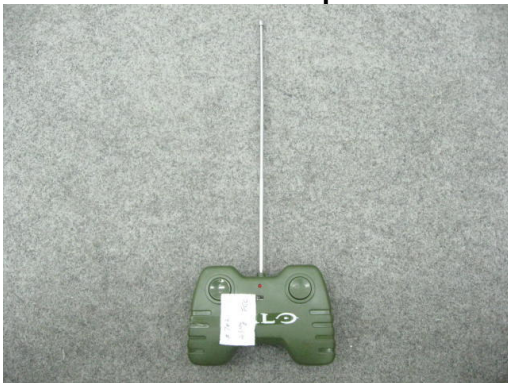
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Photographs of EUT

Front View of the product



Rear View of the product



Battery compartment



Battery Cover

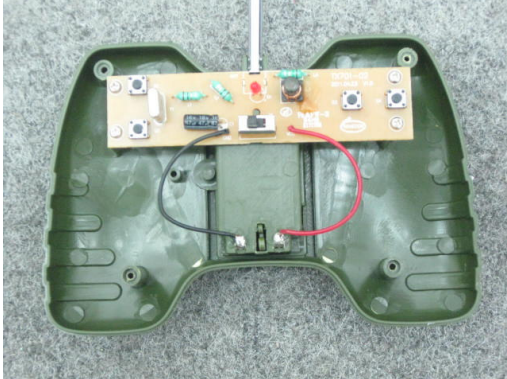




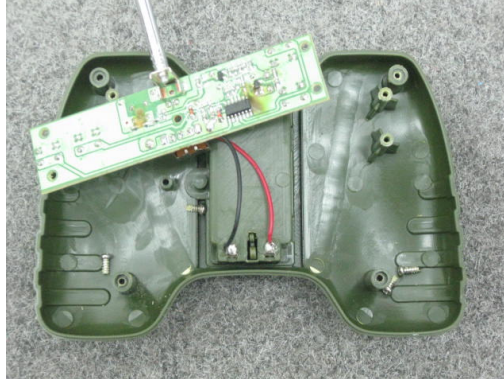
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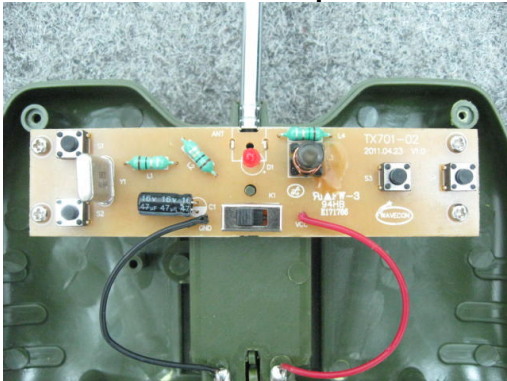
**Front View of the product (Internal)**



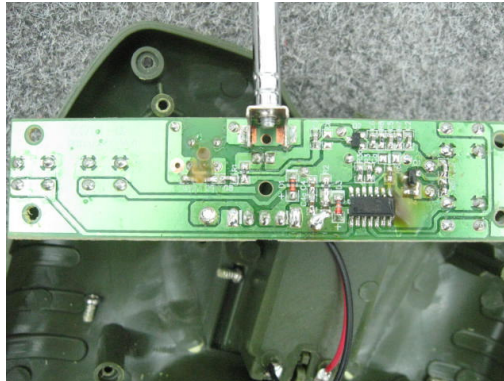
**Rear View of the product (Internal)**



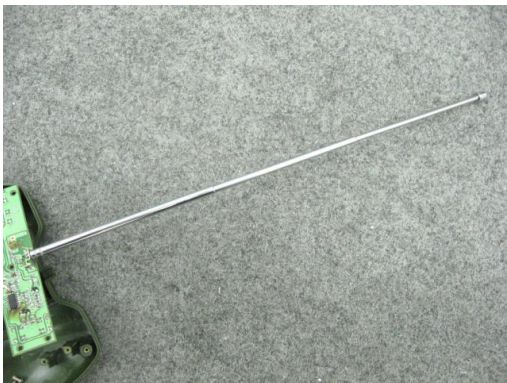
**Inner Circuit Top View**



**Inner Circuit Bottom View**



**Antenna**



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**Measurement of Radiated Emission Test Set Up**



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