

## FCC COMPLIANCE REPORT

for

Dongguan Hank Electronic Co., Ltd.

Wireless mouse

Model Number: HK-M250

Prepared for : Dongguan Hank Electronic Co., Ltd.

Address : Xitou Industrial District, Houjie Town, Dongguan City,  
Guangdong, China

Prepared By : NS Technology Co., Ltd.

Address : Chenwu Industrial Zone, Houjie Town, Dongguan City,  
Guangdong, China

Tel: +86-769-85935656

Fax: +86-769-85991080

Report Number : NSE-F08042027

Date of Test : Apr.1~6, 2008

Date of Report : Apr. 11, 2008

## TABLE OF CONTENTS

	<b>Page</b>
<b>Test Report Declaration</b>	<b>Page</b>
<b>1. GENERAL PRODUCT INFORMATION</b>	<b>4</b>
1.1. Product Function .....	4
1.2. Description of Device (EUT) .....	4
1.3. Difference between Model Numbers .....	4
1.4. Independent Operation Modes .....	4
<b>2. TEST SITES</b>	<b>5</b>
2.1. Test Facilities .....	5
2.2. List of Test and Measurement Instruments .....	6
<b>3. TEST SET-UP AND OPERATION MODES</b>	<b>7</b>
3.1. Principle of Configuration Selection.....	7
3.2. Block Diagram of Test Set-up.....	7
3.3. Test Operation Mode and Test Software.....	7
3.4. Special Accessories and Auxiliary Equipment .....	7
3.5. Countermeasures to Achieve EMC Compliance.....	7
<b>4. TEST SUMMARY</b>	<b>8</b>
4.1. Test Items and Result Lists .....	8
4.2. Test Methodology .....	8
4.3. Requirement for Compliance .....	8
<b>5. EMISSION TEST RESULTS</b>	<b>10</b>
5.1. Field Strength of Fundamental.....	10
5.2. Radiated Emission.....	12



# NS Technology Co., Ltd.

**Applicant:** Dongguan Hank Electronic Co., Ltd.  
**Address:** Xitou Industrial District, Houjie Town, Dongguan City, Guangdong, China

**Manufacturer:** Dongguan Hank Electronic Co., Ltd.  
**Address:** Xitou Industrial District, Houjie Town, Dongguan City, Guangdong, China

**E.U.T:** Wireless mouse

**Model Number:** HK-M250

**Trade Name:** ----- **Operating Frequency:** 27.045MHz

**Date of Receipt:** Mar. 31,2008 **Date of Test:** Apr.1~4,2008

**Test Specification:** FCC Part 15 Subpart C: May 4, 2007  
ANSI C63.4:2003

**Test Result:** The equipment under test was found to be compliance with the requirements of the standards applied.

**Issue Date: Apr. 11, 2008**

Tested by:

David / Engineer

Reviewed by:

Chris Du / Supervisor

Approved by:

Steven Lee / Manager

## Other Aspects:

None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of NS Technology Co., Ltd.

## 1. GENERAL PRODUCT INFORMATION

### 1.1. Product Function

The EUT is used to transmit control command only. Please refer to the user's manual for the details.

### 1.2. Description of Device (EUT)

E.U.T.	: Wireless mouse
Model No.	: HK-M250
Type of the Equipment	: Combined Equipment
Operating Frequency	: 27.045MHz
Number of Channels	: 1 Channel
Type of Modulation	: FSK
Antenna Type	: Integral
System Input Voltage	: Nominal Voltage: DC 3V(Battery)
Temperature Range(Operating)	: 0 ~+ 40°C

### 1.3. Difference between Model Numbers

None.

### 1.4. Independent Operation Modes

The basic operation mode is: TX mode

## 2. TEST SITES

### 2.1. Test Facilities

EMC Lab : Certificated by TUV Rheinland, Germany.  
Date of registration: July 28, 2003

Certificated by FCC, USA  
Registration No.: 897109  
Date of registration: October 10, 2003

Certificated by VCCI, Japan  
Registration No.: R-1798 & C-1926  
Date of registration: January 30, 2004

Certificated by CNAL, CHINA  
Registration No.: L1744  
Date of registration: November 25, 2004

Certificated by Intertek ETL SEMKO  
Registration No.: TMP-013  
Date of registration: June 11, 2005

Certificated by TUV/PS, Hong Kong  
Date of registration: December 1, 2005

Certificated by Industry Canada  
Registration No.: 5936  
Date of registration: March 24, 2006

Certificated by ATCB, America  
Date of registration: August 03, 2006

Name of Firm : NS Technology Co., Ltd.

Site Location : Chenwu Industrial Zone, Houjie Town, Dongguan City, Guangdong, China

## 2.2. List of Test and Measurement Instruments

### 2.2.1. For field strength of fundamental test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESCS30	100199	Mar.20,08	Mar.20,09
Spectrum Analyzer	HP	8593E	3448U00806	Mar.20,08	Mar.20,09
Amplifier	Agilent	8447D	2944A10488	May 2,07	May 2,08
Loop Antenna	Daze	ZA30900A	0708	Mar.20,08	Mar.20,09

### 2.2.2. For radiated emission test

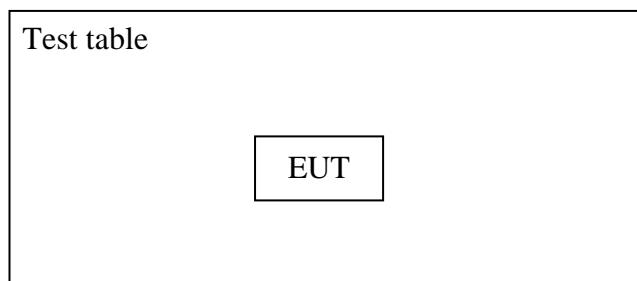
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESCS30	100199	Mar.20,08	Mar.20,09
Spectrum Analyzer	HP	8593E	3448U00806	Mar.20,08	Mar.20,09
Amplifier	Agilent	8447D	2944A10488	May 2,07	May 2,08
Bilog Antenna	EMCO	3142B	00022050	May 2,07	May 2,08

### 3. TEST SET-UP AND OPERATION MODES

#### 3.1. Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its highest possible radiated level. The test modes were adapted accordingly in reference to the Operating Instructions.

#### 3.2. Block Diagram of Test Set-up



*(EUT: Wireless mouse)*

*Note: we test lie orientation, side orientation and stand orientation. The lie orientation is the worst mode, so only the worst mode test data was included in the report.*

#### 3.3. Test Operation Mode and Test Software

Refer to clause 1.4

#### 3.4. Special Accessories and Auxiliary Equipment

None.

#### 3.5. Countermeasures to Achieve EMC Compliance

None.

## 4. TEST SUMMARY

### 4.1. Test Items and Result Lists

Test items	Test result
Field Strength of Fundamental	PASS
Radiated Emission	PASS

### 4.2. Test Methodology

For this E.U.T., the radiated emissions measurement performed according to the procedures illustrated in ANSI C63.4 and other required were illustrated in separate sections of this test report for detail.

### 4.3. Requirement for Compliance

#### 4.3.1. Field strength of fundamental

According to 15.227(a), The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

#### 4.3.2. Radiated emission

According to 15.227(b), The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

#### 4.3.3. Radiated emission limits, general requirements.

The above field strength limits are specified at a distance of 3 meters. Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength uV/meter	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

\*\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

## 4.3.4. Restricted Band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

## 5. EMISSION TEST RESULTS

### 5.1. Field Strength of Fundamental

#### 5.1.1. Applied Standard

According to 15.227(a), The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

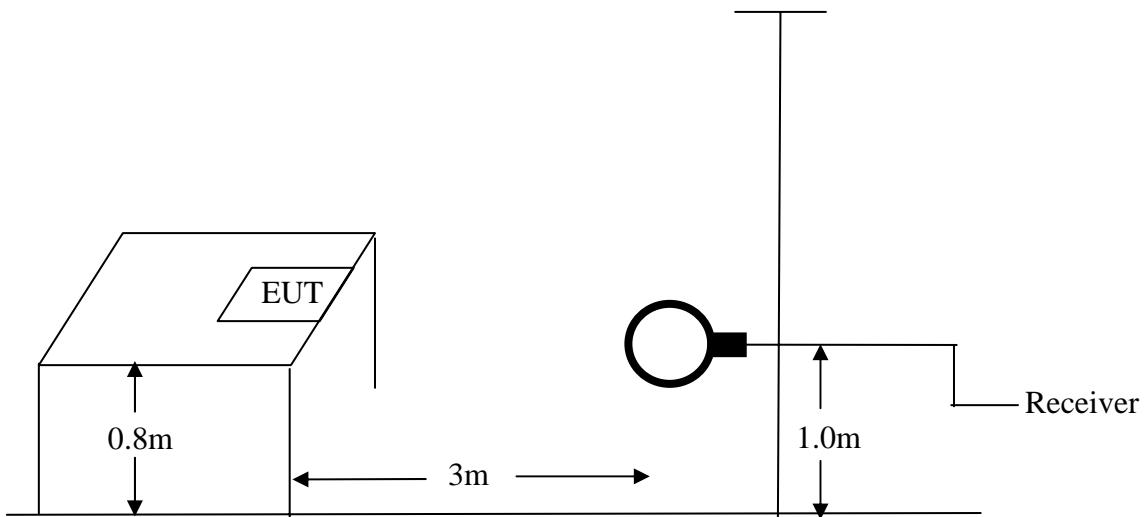
#### 5.1.2. Test procedure

- Step 1: The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- Step 2: The EUT was placed on a wooden table with a height of 0.8m above the reference ground plane in the Chamber Site. The EUT was set 3m away from the receiving antenna.
- Step 3: Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.
- Step 4: Rotate the EUT from 0° to 360° and position the receiving antenna at heights 1 meters above the reference ground plane continuously to determine the fundamental frequency and compare the maximum level with the required limit.
- Step 5: Tune the antenna and turntable around find out the position of fundamental frequency and recorded maximum emission level.
- Step 6: Change the receiving antenna to another polarization to measure Field Strength of fundamental by following step 4. to 5. again.

#### 5.1.3. Instrument Setting

RBW	VBW	Detector	Trace
9KHz	30KHz	Peak/Average	Maxhold

#### 5.1.4. Test Setup Diagram



## 5.1.5. Test result

**Pass.**

## Test Data

EUT	:	Wireless mouse	Temperature:	25.4 °C
Model No.	:	HK-M250	Humidity	55%
Test Mode	:	TX mode	Test Engineer	David

Frequency MHz	Antenna Factor	Cable Loss	Meter Reading dB $\mu$ V	Emission Level dB $\mu$ V/m	Over Limits dB	Limits		
						@3m	Detector	Polarity
27.045	23.25	0.72	50.66	45.13	-54.87	100.00	PK	H
27.045	23.25	0.72	48.75	43.22	-36.78	80.00	AV	H
27.045	23.25	0.72	45.41	39.88	-60.12	100.00	PK	V
27.045	23.25	0.72	40.75	35.22	-44.78	80.00	AV	V

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading  
 2. Peak Limit=Average Limit+20dB  
 3. Test uncertainty:  $\pm 4.76$ dB at a level of confidence of 95%.

## 5.2. Radiated Emission

### 5.2.1. Applied Standard

According to 15.227(b), The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

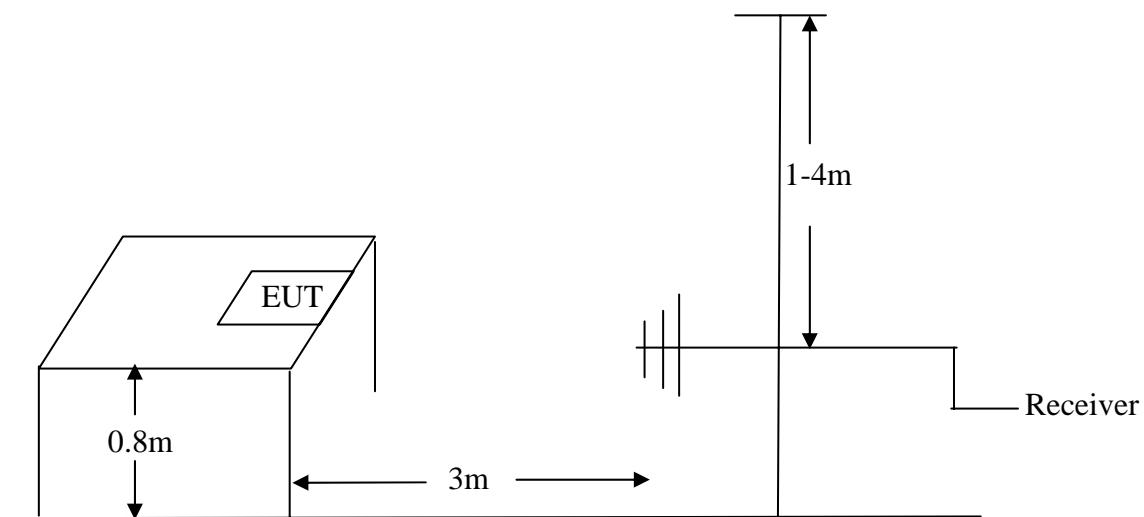
### 5.2.2. Test procedure

- Step 1: The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- Step 2: The EUT was placed on a wooden table with a height of 0.8m above the reference ground plane in the semi-anechoic chamber.
- Step 3: Keep the EUT in continuously transmitting status , Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.
- Step 4: Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine the fundamental frequency and compare the maximum level with the required limit.
- Step 5: Tune the antenna and turntable around find out the position of fundamental frequency and recorded maximum emission level.
- Step 6: Change the receiving antenna to another polarization to measure Field Strength of fundamental by following step 4. to 5. again.

### 5.2.3. Instrument Setting

RBW	VBW	Detector	Trace
120KHz	300KHz	Quasi-peak	Maxhold

### 5.2.4. Test Setup Diagram



## 5.2.5. Test Result

**Pass.**

## Test Data

EUT	:	Wireless mouse	Temperature:	25.4°C
Model No.	:	HK-M250	Humidity	55%
Test Mode	:	TX mode	Test Engineer	David

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits @3m dB $\mu$ V/m
<b>54.246</b>	<b>10.04</b>	<b>0.99</b>	<b>47.40</b>	<b>30.43</b>	<b>-9.57</b>	<b>40.00</b>
81.518	9.92	1.30	41.64	24.86	-15.14	40.00
137.036	9.88	1.76	36.75	20.39	-23.11	43.50
164.308	11.80	1.96	34.14	20.90	-22.60	43.50
190.606	12.38	2.19	34.76	22.33	-21.17	43.50
217.878	13.11	2.31	38.40	26.67	-19.33	46.00

Remark: The worst emission was detected at **54.246MHz** with corrected signal level of **30.43dB $\mu$ V/m**(Limit was **40.00 dB $\mu$ V/m**) when the antenna was at **Horizontal** polarization and at **2.0m** high, the turn table was at **174°**.

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical 1 dB $\mu$ V/m	Over Limits dB	Limits @3m dB $\mu$ V/m
<b>32.818</b>	<b>23.56</b>	<b>0.74</b>	<b>27.30</b>	<b>23.10</b>	<b>-16.90</b>	<b>40.00</b>
54.246	10.04	0.99	39.03	22.06	-17.94	40.00
81.518	9.92	1.30	36.64	19.86	-20.14	40.00
107.816	11.06	1.51	30.53	15.10	-28.40	43.50
160.412	11.58	1.96	29.72	16.06	-27.44	43.50
200.346	12.67	2.24	30.34	18.25	-25.25	43.50

Remark: The worst emission was detected at **32.818MHz** with corrected signal level of **23.10dB $\mu$ V/m** (Limit was **40.00 dB $\mu$ V/m**) when the antenna was at **Vertical** polarization and at **1.1m** high, the turn table was at **42°**.

- Notes:
1. All readings were Quasi-Peak values.
  2. Emission Level = Antenna Factor + Cable Loss + Meter Reading
  3. 0 °was the table front facing the antenna. Degree was calculated from 0 ° clockwise facing the antenna.
  - 4. Test uncertainty: ±4.76dB at a level of confidence of 95%.**