

# FCC PART 15 SUBPART C

## EMI MEASUREMENT AND TEST REPORT

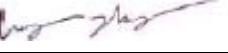
For

### DynaPoint (Dong Guan) Inc.

Huaguo, Hill Road, Jie Kou, Changan Dongguan  
GuangDong, China

**FCC ID: P4XHL5001**

2003-07-31

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> Wireless Mouse, ITE
<b>Test Engineer:</b> Ming Jing 	
<b>Report No.:</b> R0306094	
<b>Test Date:</b> 2003-06-16	
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endorsement by NVLAP or any agency of the U.S. Government.

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## 1 - GENERAL INFORMATION

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### 1.1 Product Description for Equipment Under Test (EUT)

The *DynaPoint (Dong Guan) Inc.* 's product, model *HL5001* or the "EUT" as referred to in this report is a Wireless Mouse. The EUT is measured approximately 5" L x 2.5" W x 1" H.

*\* The test data gathered are from typical production samples provided by the manufacturer.*

### 1.2 Objective

This Type approval report is prepared on behalf of *DynaPoint (Dong Guan) Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules, sec 15.209 and sec 15.227.

### 1.3 Related Submittal(s)/Grant(s)

No Related Submittals.

### 1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2001, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### 1.5 Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2001.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22: 1997, and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

## 1.6 Test Equipment List

Manufacturer	Description	Model	Serial Number	Cal. Due Date
HP	Spectrum Analyzer	8568B	Panel 2408A00105 Display 2403A06544	2004-05-01
HP	Spectrum Analyzer	8593A	29190A00242	2004-05-01
HP	Amplifier	8447E	1937A01054	2004-05-01
HP	Quasi-Peak Adapter	85650A	2521A00718	2004-05-01
Com-Power	Biconical Antenna	AB-100	14012	2004-05-01
Com-Power	LISN	LI-200	12005	2004-03-28
Com-Power	LISN	LI-200	12008	2004-03-28
Com-Power	Log Periodic Antenna	AL-100	16091	2004-05-01
Com-Power	Log Periodic Antenna	AB-900	15049	2004-05-01
HP	Voltmeter	6236B	2003A05705	Not Required

**\* Statement of Traceability:** BACL certifies that all calibration has been performed using suitable standards traceable to NIST.

## **2 - SYSTEM TEST CONFIGURATION**

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### **2.1 Justification**

The EUT was configured for testing in a typical fashion (as normally used in a typical application).

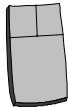
### **2.2 Schematics and Block Diagram**

Please refer to Appendix D.

### **2.3 Equipment Modifications**

No modifications were necessary for the EUT to comply with the applicable limits and standards.

### **2.4 Test Setup Configuration**



Mouse Transmitter

### 3 - SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203	Antenna requirement	Compliant
§ 15.205	Restricted Band	Compliant
§ 15.209 § 15.227	Radiated emission limit	Compliant

## 4 - RADIATED EMISSIONS TEST

### 4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is  $\pm 4.0$  dB.

### 4.2 EUT Setup

The radiated emission tests were performed in the open area 10-meter test site, using the setup accordance with the ANSI C63.4-2001. The specification used was the FCC Part 15 Subpart C limits.

The spacing between the peripherals was 10 cm.

External I/O cables are draped over edge of test table or bundled when necessary.

### 4.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR 15.33, the EUT was tested to 1000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Start Frequency .....	27 MHz
Stop Frequency .....	1000 MHz
Sweep Speed .....	Auto
IF Bandwidth .....	100 kHz
Video Bandwidth .....	1 MHz
Quasi-Peak Adapter Bandwidth.....	120 kHz
Quasi-Peak Adapter Mode .....	Normal
Resolution Bandwidth.....	1MHz

### 4.4 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within  $-4$  dB $\mu$ V of specification limitation), and are distinguished with a "QP" in the data table.

The EUT was operating in continuous transmission mode to represent worst case during final qualification test. Therefore, this configuration was used for final test data recorded in the table(s) listed under section 4.7 of this report.

## 4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB $\mu$ V means the emission is 7dB $\mu$ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

## 4.6 Summary of Test Results

According to the final data in section 4.7, the EUT complied with the FCC 15.227 and FCC 15.209 standards, and had the worst margin of:

**-3.7 dB at 81.13 MHz** in the **Vertical** polarization, 27-1000MHz, 3 meters, transmitter

## 4.7 Radiated Emissions Test Result Data

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC SUBPART C	
Frequency MHz	Ampl. dB $\mu$ V/m		Angle Degree	Height Meter	Polar H/V	Antenna dB $\mu$ V/m	Cable dB		Corr. Ampl. dB $\mu$ V/m	Limit dB $\mu$ V/m
Transmitter										
81.13	45.3	270	1.2	V	15.8	0.3	25.0	36.4	40	-3.7, PEAK
54.08	48.6	260	1.0	V	10.2	1.0	25.0	34.8	40	-5.2, PEAK
54.08	47.5	260	1.2	H	10.2	1.0	25.0	33.7	40	-6.3, PEAK
81.13	44.7	260	1.0	H	9.5	1.2	25.0	30.4	40	-9.6, PEAK
108.17	40.2	300	1.0	V	11.0	1.5	25.0	27.7	43.5	-15.8, PEAK
108.17	40.1	300	1.0	H	11.0	1.5	25.0	27.6	43.5	-15.9, PEAK
27.04	65.4	270	1.0	V	15.8	0.3	25.0	56.5	80	-23.5, AVE
27.04	64.7	270	1.0	H	15.8	0.3	25.0	55.8	80	-24.2, AVE

The mouse transmitter was placed in continuous transmit mode for all tests.

#### 4.8 Out of Band Emission

The result has been complied with the 15.227(b), see the following plot:

