



**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**Spyder Wireless Laser Mouse**

**Model: MORFAIUL / GA-6290-15**

**Trade Name: Primax / Avenues**

*Issued to*

**PRIMAX ELECTRONICS LTD.  
NO.669, RUEY KUANG ROAD, NEIHU 114, TAIPEI, TAIWAN, R.O.C**

*Issued by*

**COMPLIANCE CERTIFICATION SERVICES (SHENZHEN) INC.  
NO. 5, JINAO INDUSTRIAL PARK, NO. 35 JUKENG ROAD,  
DASHUIKENG VILLAGE, GUANLAN TOWN, BAOAN  
DISTRICT, SHENZHEN, CHINA**

**TEL: 86-755-28055000**

**FAX: 86-755-28055221**



**LAB CODE:200577-0**

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## 1. TEST RESULT CERTIFICATION

**Applicant:** PRIMAX ELECTRONICS LTD.  
NO.669, RUEY KUANG ROAD, NEIHU 114, TAIPEI, TAIWAN,  
R.O.C

**Equipment Under Test:** Spyder Wireless Laser Mouse

**Trade Name:** Primax / Avenues

**Model:** MORFAIUL / GA-6290-15

**Date of Test:** April 23-25, 2007

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

### We hereby certify that:

The above equipment was tested by Compliance Certification Services (Shenzhen) Inc.. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4:2003 and the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.227.

The test results of this report relate only to the tested sample identified in this report.

**Approved by:**

**Tested By:** Maya You

**Reviewed By:**

\_\_\_\_\_  
**Clinton Kao / Manager**  
**COMPLIANCE CERTIFICATION**  
**SERVICES (SHENZHEN) INC.**

\_\_\_\_\_  
**Eric Wong / Assistant manager**  
**COMPLIANCE CERTIFICATION**  
**SERVICES (SHENZHEN) INC.**



## 2. EUT DESCRIPTION

<b>Product</b>	Spyder Wireless Laser Mouse
<b>Trade Name</b>	Primax / Avenues
<b>Model Number</b>	MORFAIUL / GA-6290-15
<b>Model Difference</b>	All models are identical to each other except for market designation for marketing purpose.
<b>Power Supply</b>	TX: Powered by AAA batteries $\times 2$ (Rating: $2 \times 1.5\text{Vdc}$ ) RX: Powered by the notebook
<b>Frequency Range</b>	27.045 MHz
<b>Modulation Technique</b>	FSK

**Remark:** This submittal(s) (test report) is intended for FCC ID: EMJM2AI01 filing to comply with Section 15.227 of the FCC Part 15, Subpart C Rules.



### **3. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.4:2003 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.227.

#### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### **3.2 EUT EXERCISE**

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

#### **3.3 GENERAL TEST PROCEDURES**

##### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.



### 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

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

<sup>2</sup> Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

### 3.5 DESCRIPTION OF TEST MODES

The EUT has been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.



## **4. INSTRUMENT CALIBRATION**

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at

No. 5, Jinao industrial park, No.35 Jukeng Road, Dashuikeng Village, Guanlan Town, Baoan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### **5.2 EQUIPMENT**

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, loop antenna, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### **5.3 LABORATORY ACCREDITATIONS AND LISTING**

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200577-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.





## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

Device Type	Brand	Model	FCC ID	Series No.	Data Cable	Power Cord
Nil						

**Remark:**

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



## 7. FCC PART 15.227 REQUIREMENTS

### 7.1 26 DB BANDWIDTH

#### LIMIT

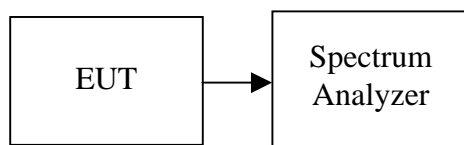
N/A

#### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/05/2008
Spectrum Analyzer	R&S	FSP30	1093.4495.30	07/22/2007

*Remark: Each piece of equipment is scheduled for calibration once a year.*

#### Test Configuration



#### TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=10kHz, VBW = RBW, Span = 500KHz, Sweep = auto.
4. Mark the peak frequency and 26dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

#### TEST RESULTS

*No non-compliance noted*



## Test Plot

Agilent 11:45:00 Apr 26, 2007

R T

▲ Mkr1 46.1 kHz  
0.05 dB

Ref 80 dBμV

#Atten 0 dB

#Peak  
Log  
10  
dB/

DI  
30.3  
dBμV  
LgAv

M1 S2  
S3 FC

£(f):  
f>50k  
Swp

Center 27.045 0 MHz

#Res BW 10 kHz

#VBW 10 kHz

Span 200 kHz  
Sweep 2.44 ms (601 pts)





## 7.2 RADIATED EMISSIONS

### LIMIT

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.

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 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.

2. In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength ( $\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

3. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (Hz)	Field Strength ( $\mu\text{V/m}$ at meter)	Measurement Distance (meter)
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 54-72 MHz, 76-88 MHz, 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.

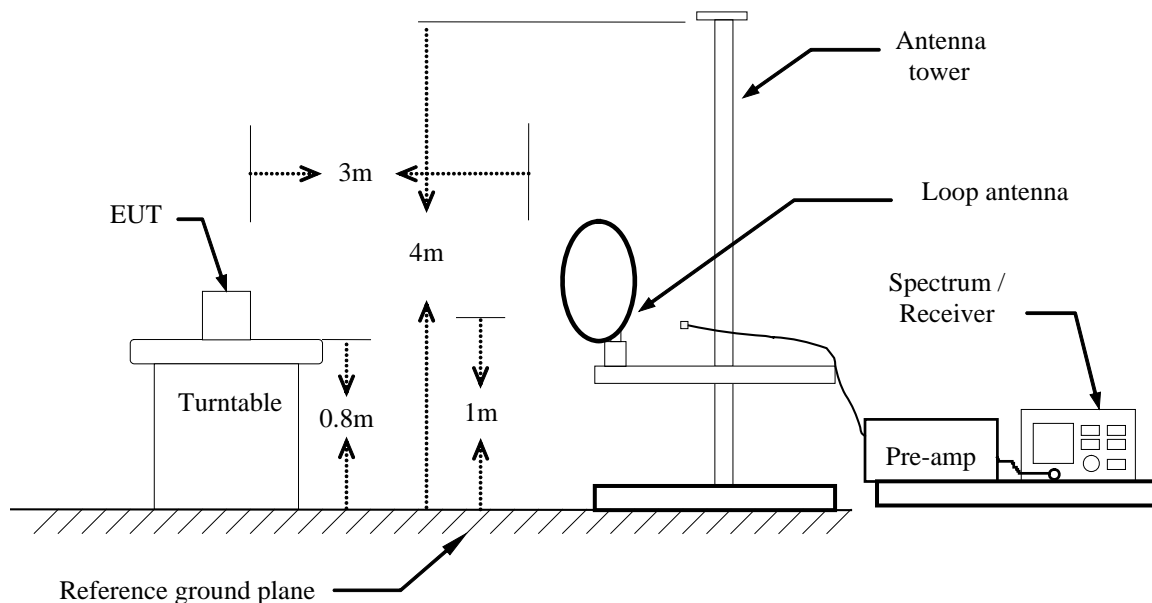
## **MEASUREMENT EQUIPMENT USED**

966 RF CHAMBER 2				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/05/2008
EMI Test Receiver	R&S	ESCI	1166.5950 03	01/13/2008
Pre-Amplifier	MITEQ	N/A	AFS42-00102650-42-10P-42	02/14/2008
Bilog Antenna	SCHWAZBECK	CBL6143	5082	06/09/2007
Turn Table	EMCO	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CT	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	09/06/2007
Horn Antenna	TRC	N/A	N/A	03/04/2008

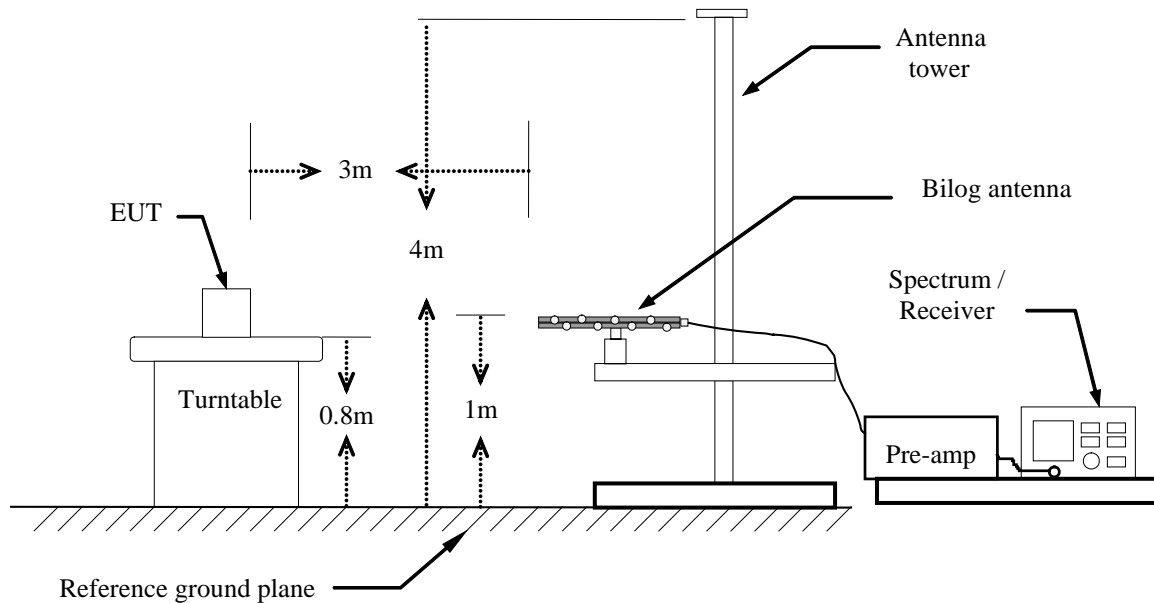
**Remark:** Each piece of equipment is scheduled for calibration once a year.

### **Test Configuration**

**Below 30MHz**



## Below 1 GHz



## TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.



## TEST RESULTS

### Below 1 GHz

Operation Mode: TX Test Date: April 25, 2006  
Temperature: 25°C Tested by: Henry  
Humidity: 55 % RH Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP/AVG)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
27.045	V	Peak	47.25	5.15	52.40	80.00	-27.60
53.850	V	Peak	36.04	-16.21	19.83	40.00	-20.17
91.200	V	Peak	35.44	-15.90	19.54	43.50	-23.96
123.150	V	Peak	40.10	-16.67	23.43	43.50	-20.07
144.750	V	Peak	49.30	-16.17	33.13	43.50	-10.37
158.250	V	Peak	51.09	-15.16	35.93	43.50	-7.57
324.500	V	Peak	33.52	-10.12	23.40	46.00	-22.60
27.045	H	Peak	50.03	5.15	55.18	80.00	-24.82
54.300	H	Peak	42.54	-16.30	26.24	40.00	-13.76
110.550	H	Peak	56.48	-16.10	40.38	43.50	-3.12
156.900	H	Peak	51.60	-15.26	36.34	43.50	-7.16
297.300	H	Peak	39.36	-10.97	29.39	46.00	-17.61
324.500	H	Peak	44.37	-10.12	34.25	46.00	-11.75
351.333	H	Peak	36.89	-9.32	27.57	46.00	-18.43

**Remark:**

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



### 7.3 POWERLINE CONDUCTED EMISSIONS

#### **LIMIT**

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

#### **MEASUREMENT EQUIPMENT USED**

Conducted Emission Test Site G				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESCI EMI TEST RECEIV.ESCI	ROHDE&SCHWARZ	1166.5950 03	100088	02/05/2008
LISN	EMCO	3825/2	1371	02/05/2008
LISN	EMCO	3825/2	8901-1459	02/05/2008

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### **Test Procedure**

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

#### **TEST RESULTS**

*Not applicable.*

*(Since the EUT is battery-powered)*



## APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

### RADIATED EMISSION TEST

#### Below 30MHz



#### Below 1GHz

