



FCC TEST REPORT

for

Dynex Wireless Optical Mouse
MODEL: MORFCGUO/DX-PWLMSE

Test Report Number:
SZ071029B10 -RP

Issued for

PRIMAX Electronics Ltd
No. 669, Ruey Kuang Road, Neihu 114, Taipei, Taiwan. R.O.C.

Issued by:

COMPLIANCE CERTIFICATION SERVICES (SHENZHEN) INC.
(aka Compliance Engineering Service (China))

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

Issued Date: November 05, 2007

Note: *This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, A2LA, NVLAP, NIST or any government agencies. The test results in the report only apply to the tested sample.*



Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 10, 2007	Initial Issue	ALL	Clinton Kao



TABLE OF CONTENTS

1 TEST CERTIFICATION 4

2 EUT DESCRIPTION 5

3 TEST RESULT SUMMARY 5

4 TEST METHODOLOGY 6

4.1. EUT EXERCISE 6

4.2. FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS..... 6

4.3. DESCRIPTION OF TEST MODES 6

5 INSTRUMENT CALIBRATION 7

6 SETUP OF EQUIPMENT UNDER TEST 7

6.1. DESCRIPTION OF SUPPORT UNITS..... 7

6.2. CONFIGURATION OF SYSTEM UNDER TEST 7

7 FACILITIES AND ACCREDITATIONS..... 8

7.1. FACILITIES..... 8

7.2. ACCREDITATIONS 8

7.3. MEASUREMENT UNCERTAINTY 8

8 FCC PART 15.227 REQUIREMENTS 9

8.1. 26 DB BANDWIDTH 9

8.1.1. LIMIT 9

8.1.2. MEASUREMENT EQUIPMENT USED 9

8.1.3. TEST CONFIGURATION 9

8.1.4. TEST PROCEDURE 9

8.1.5. TEST RESULTS 9

8.2. POWER LINE CONDUCTED EMISSIONS MEASUREMENT 11

8.2.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT..... 11

8.2.2. TEST INSTRUMENTS 11

8.2.3. TEST PROCEDURES (PLEASE REFER TO MEASUREMENT STANDARD)..... 12

8.2.4. TEST SETUP 12

8.2.5. DATA SAMPLE: 13

8.2.6. TEST RESULTS..... 13

8.3. RADIATED EMISSIONS..... 14

8.3.1. LIMITS OF RADIATED EMISSIONS MEASUREMENT 14

8.3.2. TEST INSTRUMENTS 15

8.3.3. TEST PROCEDURE (PLEASE REFER TO MEASUREMENT STANDARD) 15

8.3.4. TEST SETUP 16

8.3.5. DATA SAMPLE: 17

8.3.6. TEST RESULTS..... 18



1 TEST CERTIFICATION

Product: Dynex Wireless Optical Mouse

Model: MORFCGUO/DX-PWLMSE

Brand: PRIMAX / BEST BUY

Tested: October 29-November 05,2007

Applicant: PRIMAX Electronics Ltd
No. 669, Ruey Kuang Road, Neihu 114, Taipei, Taiwan. R.O.C.

Manufacturer: Dongguan Primax Electronic & Telecommunication Products Ltd.
Liu Wu District, Shek Kit Town, Dongguan City, Guang Dong Province, P.R. China

APPLICABLE STANDARDS

Standard	Test Type	Standard	Test Type
15.227	26dB Bandwidth Measurement	15.227	Power Line Conducted Emissions
15.227	Radiated Emissions		

DEVIATION FROM APPLICABLE STANDARD

None

The above equipment was tested by Compliance Certification Services 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 EUT 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:

Reviewed by:

Clinton Kao
Manager
Compliance Certification Service Inc.

Vincent Yao
Assistant manager
Compliance Certification Service Inc.



2 EUT DESCRIPTION

Product	Dynex Wireless Optical Mouse
Model Number	MORFCGUO/DX-PWLMSE
Trade Name	PRIMAX / BEST BUY
Model Discrepancy	All the above models are identical except the model designation for different market.
Power Supply	TX: Powered by AAA batteries × 2 (Rating: 2 × 1.5Vdc)
Frequency Range	27.045 MHz
Modulation Technique	FSK

Note: 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

2. This submittal(s) (test report) is intended for FCC ID: EMJM2CG01 filing to comply with Section 15.227 of the FCC Part 15, Subpart C Rules.

3 TEST RESULT SUMMARY

APPLICABLE STANDARDS			
Standard	Test Type	Result	Remark
15.227	26dB Bandwidth Measurement	Pass	Meet the requirement of limit.
15.227	Radiated Emissions	Pass	Meet the requirement of limit.
15.227	Power Line Conducted Emissions	N/A	Meet the requirement of limit.

Note: 1. The test result judgment is decided by the limit of test standard
2. The information of measurement uncertainty is available upon the customer's request.



4 TEST METHODOLOGY

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

4.1. EUT EXERCISE

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

4.2. 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
¹ 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	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² 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.

4.3. DESCRIPTION OF TEST MODES

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



5 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.

6 SETUP OF EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1	N/A						

Note:

- 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.

6.2. CONFIGURATION OF SYSTEM UNDER TEST

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.

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



7 FACILITIES AND ACCREDITATIONS

7.1. 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 C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

7.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA,
Taiwan	TAF

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsemc.com>.

7.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ETR 028:

Measurement	Frequency		Uncertainty
Conducted emissions	9kHz~30MHz		± 3.5863
Radiated emissions	Horizontal	30MHz ~ 200MHz	± 4.7685
		200MHz ~1000MHz	± 4.9330
	Vertical	30MHz ~ 200MHz	± 5.0411
		200MHz ~1000MHz	± 4.9262

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



8 FCC PART 15.227 REQUIREMENTS

8.1. 26 dB BANDWIDTH

8.1.1. LIMIT

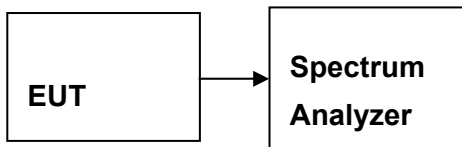
N/A

8.1.2. MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/05/2008

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

8.1.3. TEST CONFIGURATION



8.1.4. TEST PROCEDURE

- Place the EUT on the table and set it in the transmitting mode.
- Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- Set the spectrum analyzer as RBW=10kHz, VBW = RBW, Span = 200KHz, Sweep = auto.
- Mark the peak frequency and 26dB (upper and lower) frequency.
- Repeat until all the rest channels are investigated.

8.1.5. TEST RESULTS

No non-compliance noted



Test Plot

Agilent 16:37:53 Nov 2, 2007

R T

Mkr1 42.8 kHz
0.13 dB

Ref 90 dBμV

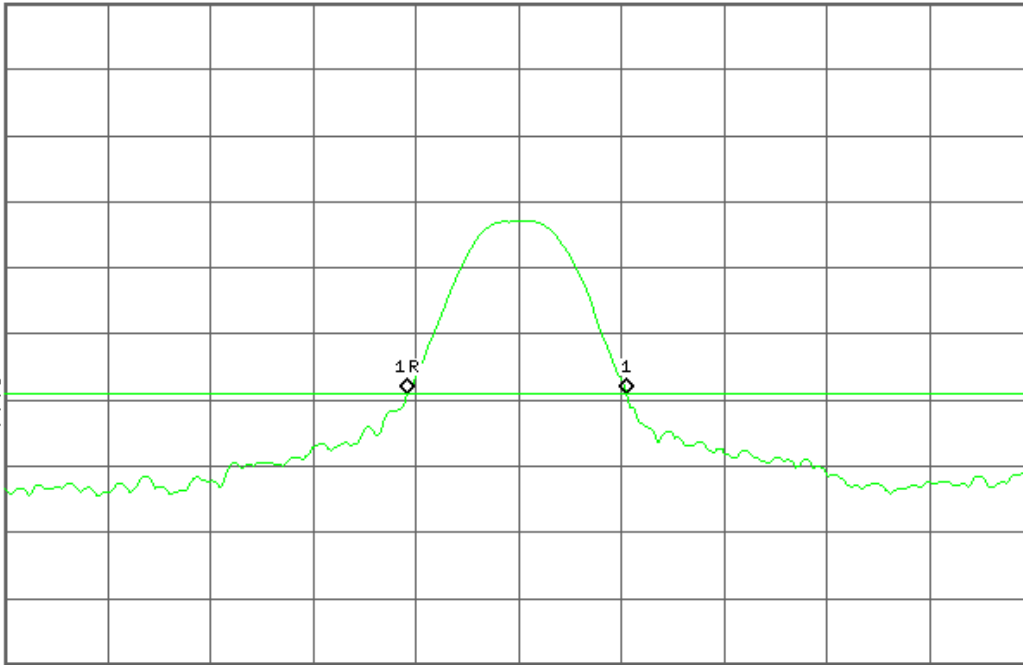
Atten 10 dB

#Peak
Log
10
dB/

DI
31.0
dBμV
LgAv

M1 S2
S3 FC

E(f):
f>50k
Swp



Center 27.045 0 MHz

Span 200 kHz

#Res BW 10 kHz

#VBW 10 kHz

Sweep 2.44 ms (601 pts)



8.2. POWER LINE CONDUCTED EMISSIONS MEASUREMENT

8.2.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that 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 the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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

NOTE:

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

8.2.2. TEST INSTRUMENTS

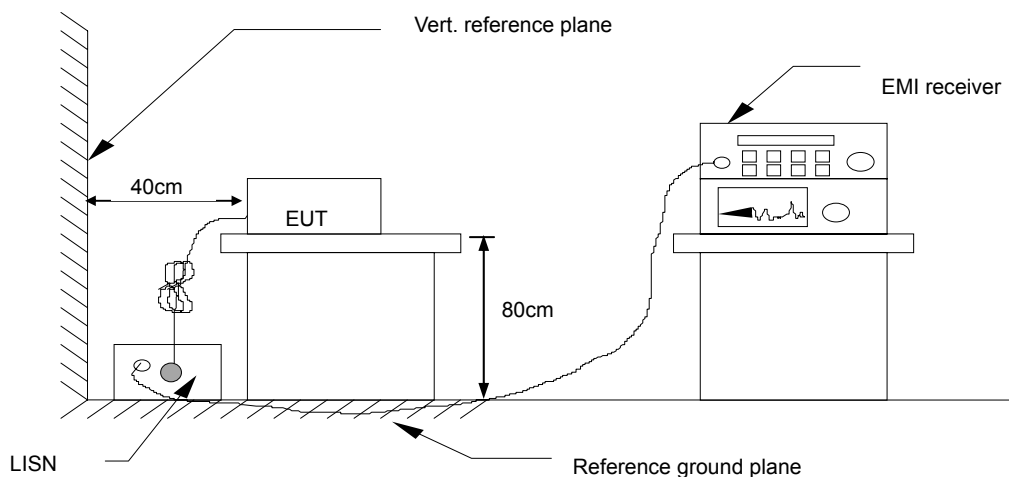
Conducted Emission Test Site G				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESCI EMI TEST RECEIV.ESCI	ROHDE&SCHWARZ	1166.5950 03	100088	02/05/2008
LISN	EMCO	3825/2	1371	02/05/2008
LISN	EMCO	3825/2	8901-1459	02/05/2008

- NOTE:**
- 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 - 2. N.C.R = No Calibration Request.

8.2.3. TEST PROCEDURES (please refer to measurement standard)

- The EUT and Support equipment, if needed, was placed on a non-conducted table, which is 0.8m above the ground plane and 0.4m away from the conducted wall.
- The test equipment EUT installed received AC main power, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane. All support equipment power received from a second LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The frequency range from 150 kHz to 30 MHz was searched. The test data of the worst-case condition(s) was recorded. Emission levels under limit 20dB were not recorded.

8.2.4. TEST SETUP



- For the actual test configuration, please refer to the related item - Photographs of the Test Configuration.



8.2.5. Data Sample:

Frequency (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Correction factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
XXX	37.58	35.11	10.10	47.68	45.21	63.49	53.49	-15.81	-8.28	L1

Frequency (MHz) = Emission frequency in MHz
 Reading (dBuV) = Uncorrected Analyzer/Receiver reading
 Correction factor (dB) = Insertion loss of LISN
 Limit (dBuV) = Limit stated in standard
 Margin (dB) = Reading (dBuV) – Limit (dBuV)
 Note = Current carrying line of reading

8.2.6. TEST RESULTS

Not applicable.
(Since the EUT is battery-powered)



8.3. RADIATED EMISSIONS

8.3.1. LIMITS OF RADIATED EMISSIONS MEASUREMENT

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 (μV/m at 3-meter)	Field Strength (dBμV/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 (μV/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.



8.3.2. TEST INSTRUMENTS

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	AFS42-00102650-4 2-10P-42	02/14/2008
Bilog Antenna	SCHWAZBECK	CBL6143	5082	06/09/2008
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	06/09/2008
Horn Antenna	TRC	N/A	N/A	03/04/2008

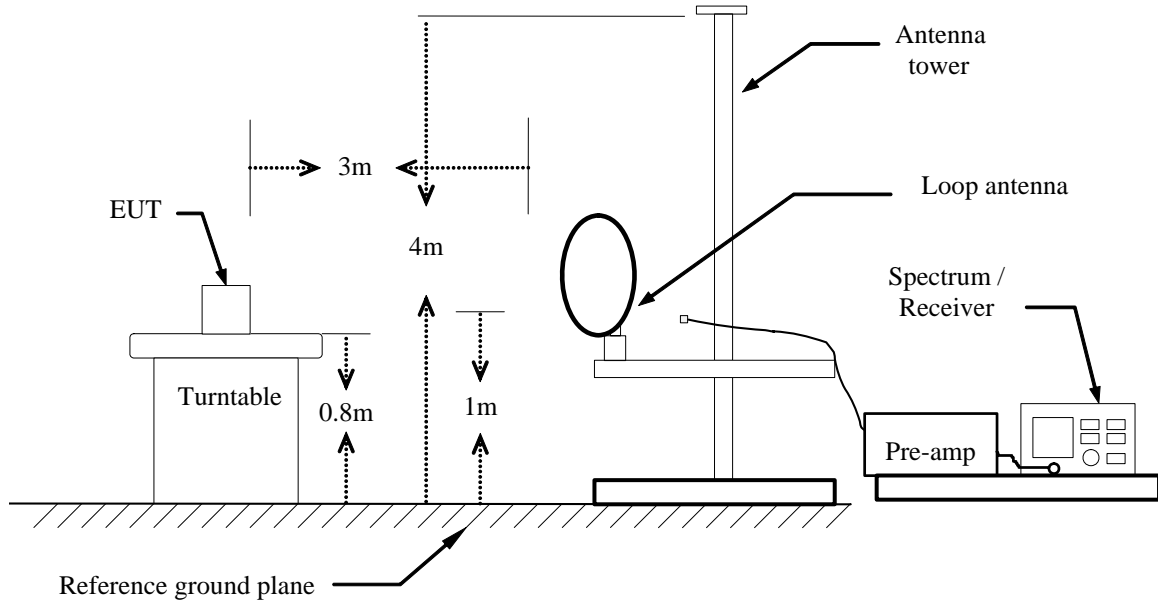
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The FCC Site Registration number is 93105,90471.
 4. N.C.R = No Calibration Required.

8.3.3. TEST PROCEDURE (please refer to measurement standard)

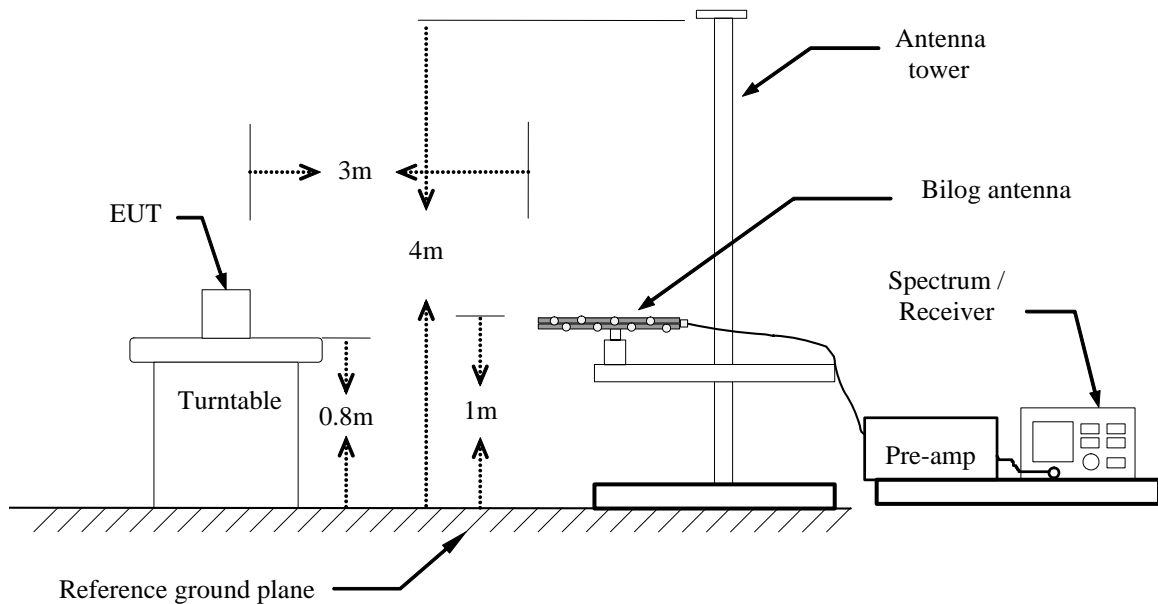
1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure 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. Set the spectrum analyzer in the following setting as:
 Below 1GHz:
 RBW=100kHz / VBW=100kHz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

8.3.4. TEST SETUP

Below 30MHz



Below 1 GHz



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



8.3.5. DATA SAMPLE:

Below 1 GHz

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Remark) (dBuV)	Correction Factor (dB/m)	Result (Remark) (dBuV/m)	Limit (Peak) (dBuV/m)	Margin (dB)	Remark
xxx	V	41.50	-16.47	25.03	40.00	-14.97	Peak

- Frequency (MHz) = Emission frequency in MHz
- Ant.Pol. (H/V) = Antenna polarization
- Reading (dBuV) = Uncorrected Analyzer / Receiver reading
- Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
- Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)
- Limit (dBuV/m) = Limit stated in standard
- Margin (dB) = Remark Result (dBuV/m) – Limit (dBuV/m)
- Peak = Peak Reading
- QP = Quasi-peak Reading
- AVG = Average Reading



8.3.6. TEST RESULTS

Below 1 GHz

Operation Mode: TX

Test Date: October 30, 2007

Temperature: 26°C

Tested by: Tom Gan

Humidity: 50 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
27.045	V	Peak	63.58	-5.15	58.43	80.00	-21.57
31.800	V	Peak	34.56	-6.71	27.85	40.00	-12.15
54.300	V	Peak	38.37	-16.30	22.07	40.00	-17.93
84.900	V	Peak	39.60	-16.36	23.24	40.00	-16.76
125.850	V	Peak	37.07	-16.65	20.42	43.50	-23.08
378.166	V	Peak	40.75	-8.91	31.84	46.00	-14.16
500.666	V	Peak	36.09	-7.49	28.60	46.00	-17.40
27.045	H	Peak	64.87	-5.15	59.72	80.00	-20.28
53.850	H	Peak	44.72	-16.21	28.51	40.00	-11.49
81.300	H	Peak	38.46	-16.64	21.82	40.00	-18.18
108.300	H	Peak	37.83	-15.95	21.88	43.50	-21.62
135.300	H	Peak	41.73	-16.57	25.16	43.50	-18.34
153.300	H	Peak	50.66	-15.53	35.13	43.50	-8.37
378.166	H	Peak	39.11	-8.91	30.20	46.00	-15.80

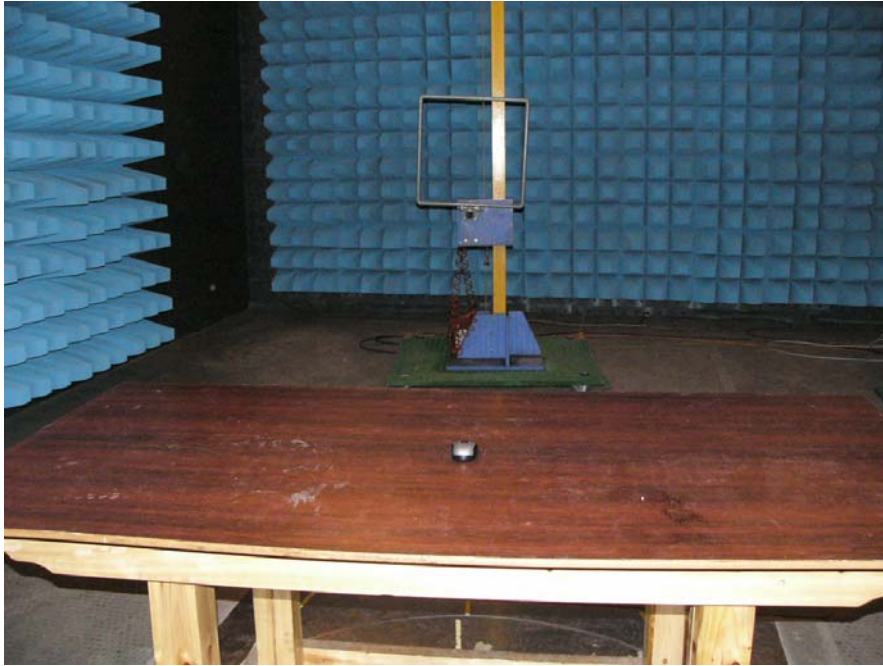
REMARKS:

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/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

APPENDIX II PHOTOGRAPHS OF THE TEST CONFIGURATION

Radiated Emissions Setup Photos

Below 30MHz



Below 1GHz

