FCC Test Report

Issued Date	: Mar. 31, 2009
Project No.	: 0903C101
Equipment	: Nano II 2.4G Laser mouse
Model Name	: MORFDEUL; M42N01-7N
Applicant	: PRIMAX Electronics Ltd.
Address	: No. 669, Ruey Kuang Road, Neihu 114, Taipei, Taiwan. R.O.C

Tested by:
Neutron Engineering Inc. EMC Laboratory
Date of Test:
Mar. 20, 2009 ~ Mar. 30, 2009

Testing Engineer: _____ (Jeff Yang)

Technical Manager: _____ (Vic Chiu)

Authorized Signatory : _____ (Steven Lu)

NEUTRON ENGINEERING INC.

B1,No.37,Lane 365,Yang Guang St.,NeiHu District 114.,Taipei,Taiwan
TEL : (02) 2657-3299 FAX : (02) 2657-3331

NVLAP Lab Code: 200145-0

R-2069 C-2818

Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**., or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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1. CERTIFICATION

Equipment :	Nano II 2.4G Laser mouse
Brand Name :	Primax; Ingram Micro
Model Name :	MORFDEUL; M42N01-7N
Applicant :	PRIMAX Electronics Ltd.
Factory :	Dongguan Primax Electronic & Telecommunication Products Ltd.
Address :	Liu Wu District, Shek Kit Town, Dongguan City, Guang Dong Province, P.R. China
Date of Test :	Mar. 20, 2009 ~ Mar. 30, 2009
Standards :	FCC Part 15, Subpart B, Class B CISPR 22: 1997+A1: 2000, Class B ANSI C63.4-2003

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCE-1-0903C101) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part15, Subpart B CISPR 22:1997+A1: 2000	Conducted Emission	-	N/A	Note(1)
	Radiated Emission	Class B	PASS	

NOTE:

(1) ” N/A” denotes test is not applicable in this Test Report.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **C01/OS02** at the location of No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan.

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95**%。

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
C01	ANSI	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U，(dB)	NOTE
OS-01	ANSI	30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
OS-02	ANSI	30MHz ~ 200MHz	V	2.48	
		30MHz ~ 200MHz	H	2.16	
		200MHz ~ 1,000MHz	V	2.50	
		200MHz ~ 1,000MHz	H	2.66	

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>Nano II 2.4G Laser mouse</td></tr>
<tr><td>Brand Name</td><td>Primax; Ingram Micro</td></tr>
<tr><td>Model Name</td><td>MORFDEUL; M42N01-7N</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>OEM Model Name/Brand</td><td>Different mode, the sale of different customers, different is appearance and software and key functions.</td></tr>
<tr><td>Product Description</td><td>The EUT is a Nano II 2.4G Laser mouse.
<table>
<tr><td>Product Type</td><td>Low Power Communication Device</td></tr>
<tr><td>Operation Frequency:</td><td>2402~2478MHz</td></tr>
<tr><td>Modulation Type:</td><td>GFSK</td></tr>
<tr><td>Number Of Channel</td><td>77CH .Please see Note 2.</td></tr>
<tr><td>Antenna Designation:</td><td>Printed antenna</td></tr>
<tr><td>Antenna Gain(Peak)</td><td>2.32 dBi</td></tr>
<tr><td>Output Power:</td><td>93.06 dBuV/m (AV Max.)</td></tr>
</table>
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.</td></tr>
<tr><td>Power Source</td><td>DC Voltage supplied from 1*AA size Battery.</td></tr>
<tr><td>Power Rating</td><td>DC 1.5V</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the User's Manual</td></tr>
<tr><td>Products Covered</td><td>N/A</td></tr>
<tr><td>EUT Modification(s)</td><td>N/A</td></tr>
</table>

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	28	2429	55	2456
02	2403	29	2430	56	2457
03	2404	30	2431	57	2458
04	2405	31	2432	58	2459
05	2406	32	2433	59	2460
06	2407	33	2434	60	2461
07	2408	34	2435	61	2462
08	2409	35	2436	62	2463
09	2410	36	2437	63	2464
10	2411	37	2438	64	2465
11	2412	38	2439	65	2466
12	2413	39	2440	66	2467
13	2414	40	2441	67	2468
14	2415	41	2442	68	2469
15	2416	42	2443	69	2470
16	2417	43	2444	70	2471
17	2418	44	2445	71	2472
18	2419	45	2446	72	2473
19	2420	46	2447	73	2474
20	2421	47	2448	74	2475
21	2422	48	2449	75	2476
22	2423	49	2450	76	2477
23	2424	50	2451	77	2478
24	2425	51	2452		
25	2426	52	2453		
26	2427	53	2454		
27	2428	54	2455		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed Antenna	N/A	2.32

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Normal Link

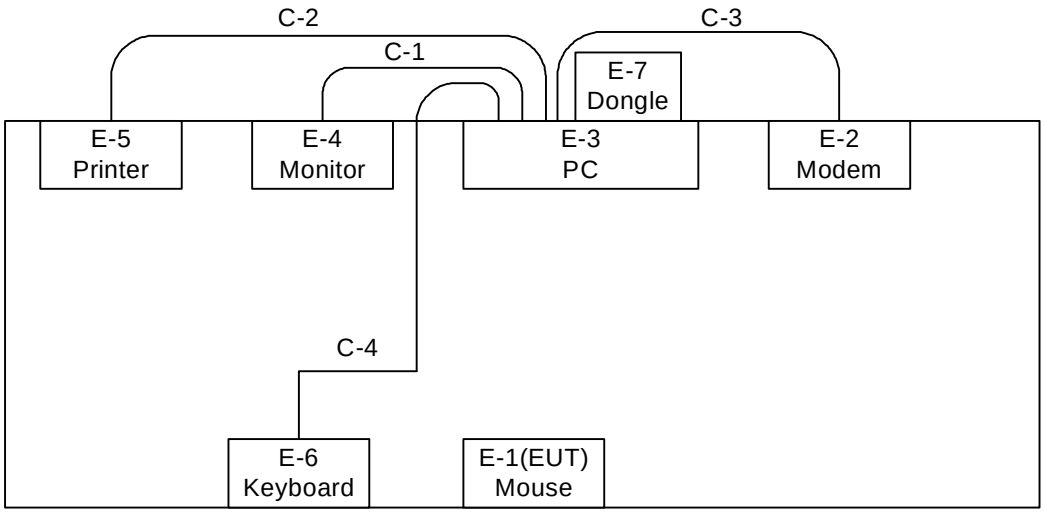
For Conducted Test	
Final Test Mode	Description
	N/A - denotes test is not applicable in this test report

For Radiated Test	
Final Test Mode	Description
Mode 1	Normal Link

Note:

(1) The EUT used new battery.
(2) N/A - denotes test is not applicable in this test report
(3) Mouse sample function have transceiver mode

3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



C-1 VGA Cable
C-2 Parallel Cable
C-3 RS232 Cable
C-4 USB Cable

3.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	Nano II 2.4G Laser mouse	Primax; Ingram Micro	MORFDEUL	EMJMMORFDEUL	N/A	EUT
E-2	Modem	ACEEX	DM-1414V	DOC	0603002131	
E-3	PC	lenovo	H2510	DOC	11S30001781001078 4F1PV	
E-4	LCD Monitor	DELL	E177FPc	DOC	CNOFJ179-64180-6A G-1WNS	
E - 5	Printer	SII	DPU-414	DOC	3018507 B	
E - 6	USB keyboard	HP	SK-2880	DOC	N/A	
E-7	Nano II Dongle	Primax; Ingram Micro	MORFDEUL	EMJMMORFDEUL	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	YES	1.5M	
C-2	NO	NO	1.8M	
C-3	NO	NO	1.5M	
C-4	NO	NO	1.8M	

Note:

(1) The support equipment was authorized by Declaration of Conformity.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION (FREQUENCY RANGE 150KHZ-30MHZ)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00042991	Jan. 23, 2010
2	LISN	EMCO	3816/2	00042990	Jan. 23, 2010
3	Pulse Limiter	Electro-Metrics	EM-7600	112644	Nov. 26, 2009
4	50Ω Terminator	N/A	N/A	N/A	May.12, 2009
5	Test Cable	N/A	C01	N/A	Nov. 26, 2009
6	EMI Test Receiver	R&S	ESCI	100082	Mar. 06 2010

Remark: ” N/A” denotes No Model Name , Serial No. or No Calibration specified.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

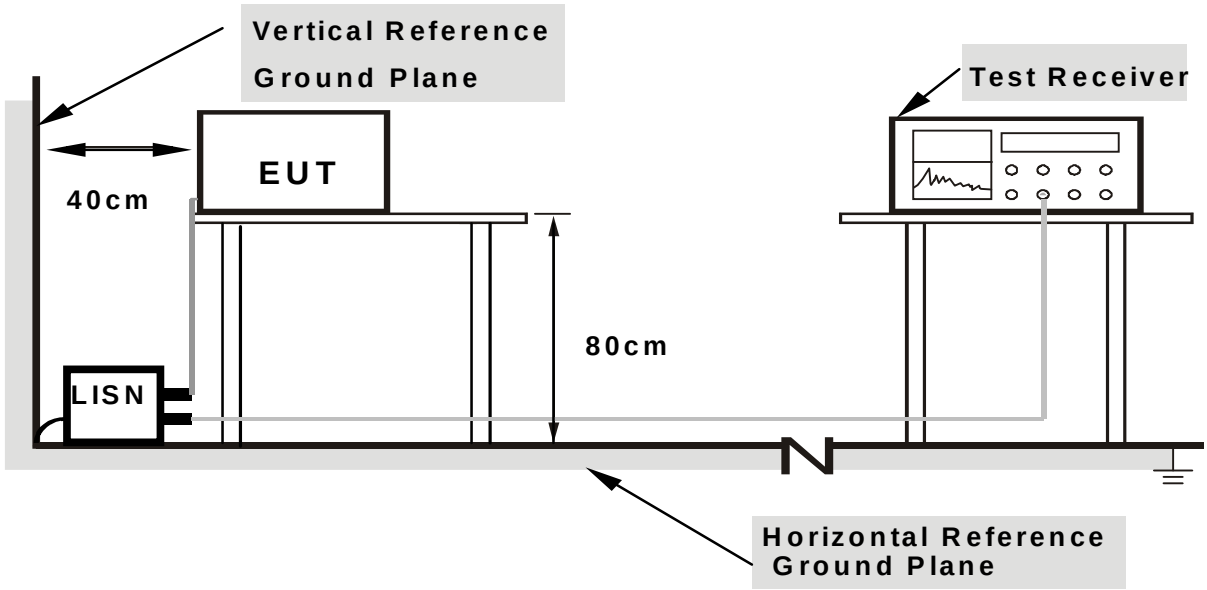
4.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

4.1.6 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use. The program contained on a PC hard disk and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn.

4.1.7 TEST RESULTS

EUT：	Nano II 2.4G Laser mouse	Model Name. ：	MORFDEUL
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Power ：	DC 1.5V
Test Mode ：	N/A - denotes test is not applicable in this test report		

Remark

(1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform。In this case, a " * " marked in AVG Mode column of Interference Voltage Measured。

(2) Measuring frequency range from 150KHz to 30MHz。

(3) N/A - denotes test is not applicable in this test report

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 – 230	40	30
230 – 1000	47	37

Notes:

(1) The limit for radiated test was performed according to as following: CISPR 22/ FCC PART 15B /ICES-003.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	Schwarzbeck	VULB 9160	3058	Mar. 18, 2010
2	Test Cable	N/A	10M_OS02	N/A	Nov. 26, 2009
3	Test Cable	N/A	OS02-1/-2/-3	N/A	Nov. 26, 2009
4	Pre-Amplifier	Anritsu	MH648A(OS 02)	M10061	Nov. 26, 2009
5	EMI Test Receiver	R&S	ESCI	100082	Jan. 29, 2010
6	Antenna Mast	Chance Most	CMTB-1.5	N/A	N/A
7	Turn Table	Chance Most	CMTB-1.5	N/A	N/A

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

4.2.3 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

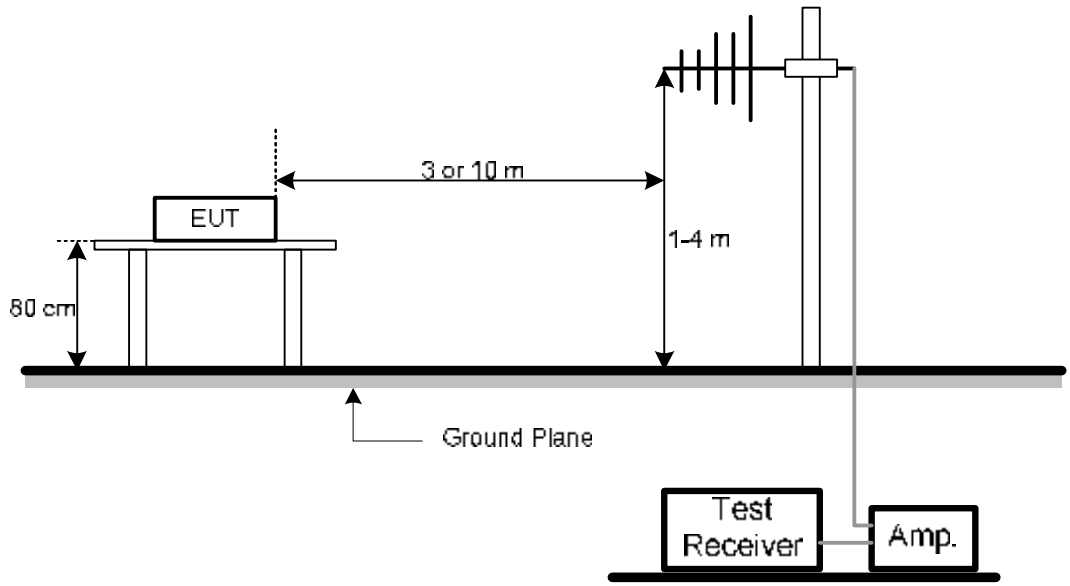
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



4.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.7** Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.7 TEST RESULTS (30M~1000MHZ)

EUT：	Nano II 2.4G Laser mouse	Model Name. ：	MORFDEUL
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Power ：	DC 1.5V
Test Mode ：	Mode 1		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
62.10	V	34.28	-10.48	23.80	30.00	- 6.20	
93.80	V	38.58	-14.45	24.13	30.00	- 5.87	
146.20	V	29.77	-9.58	20.19	30.00	- 9.81	
280.40	V	38.48	-8.76	29.72	37.00	- 7.28	
320.60	V	34.07	-7.57	26.50	37.00	- 10.50	
473.50	V	27.13	-2.68	24.45	37.00	- 12.55	

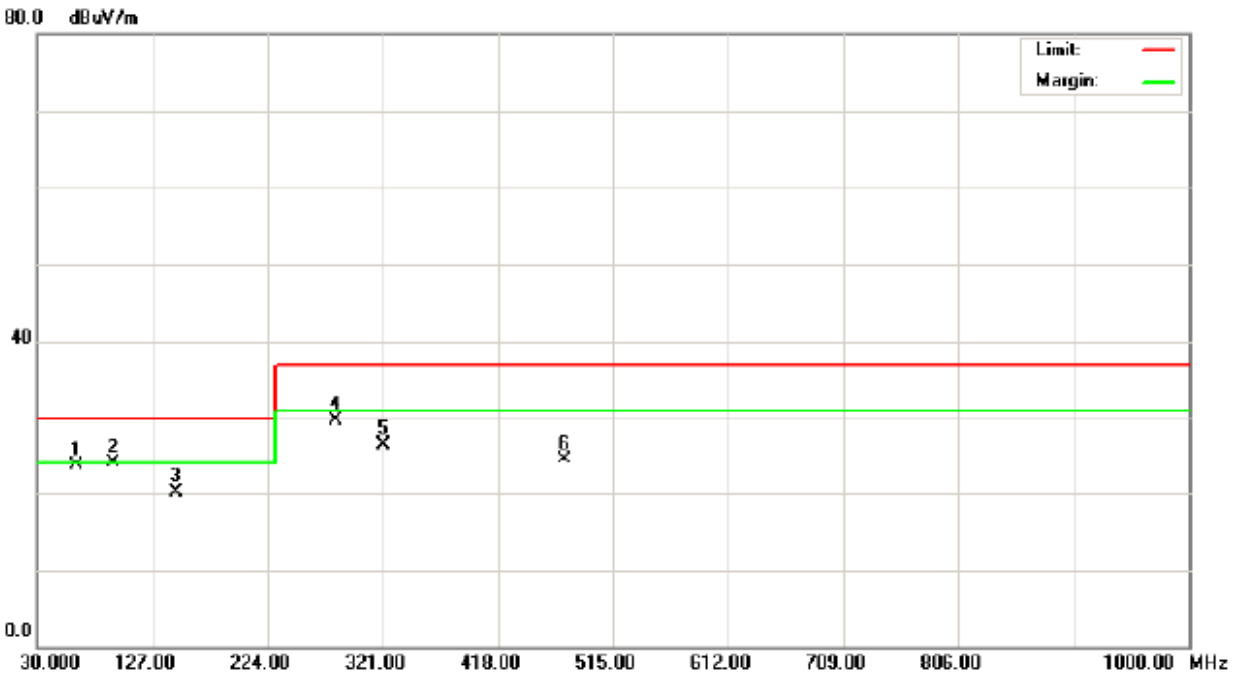
Remark：

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz。

(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(3) Measuring frequency range from 30MHz to 1000MHz。

(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table。



EUT：	Nano II 2.4G Laser mouse	Model Name. ：	MORFDEUL
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Power ：	DC 1.5V
Test Mode ：	Mode 1		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
61.20	H	34.85	-10.35	24.50	30.00	- 5.50	
144.50	H	31.28	-9.59	21.69	30.00	- 8.31	
192.00	H	33.78	-11.04	22.74	30.00	- 7.26	
283.10	H	37.09	-8.57	28.52	37.00	- 8.48	
386.50	H	32.07	-5.58	26.49	37.00	- 10.51	
480.10	H	30.99	-2.45	28.54	37.00	- 8.46	

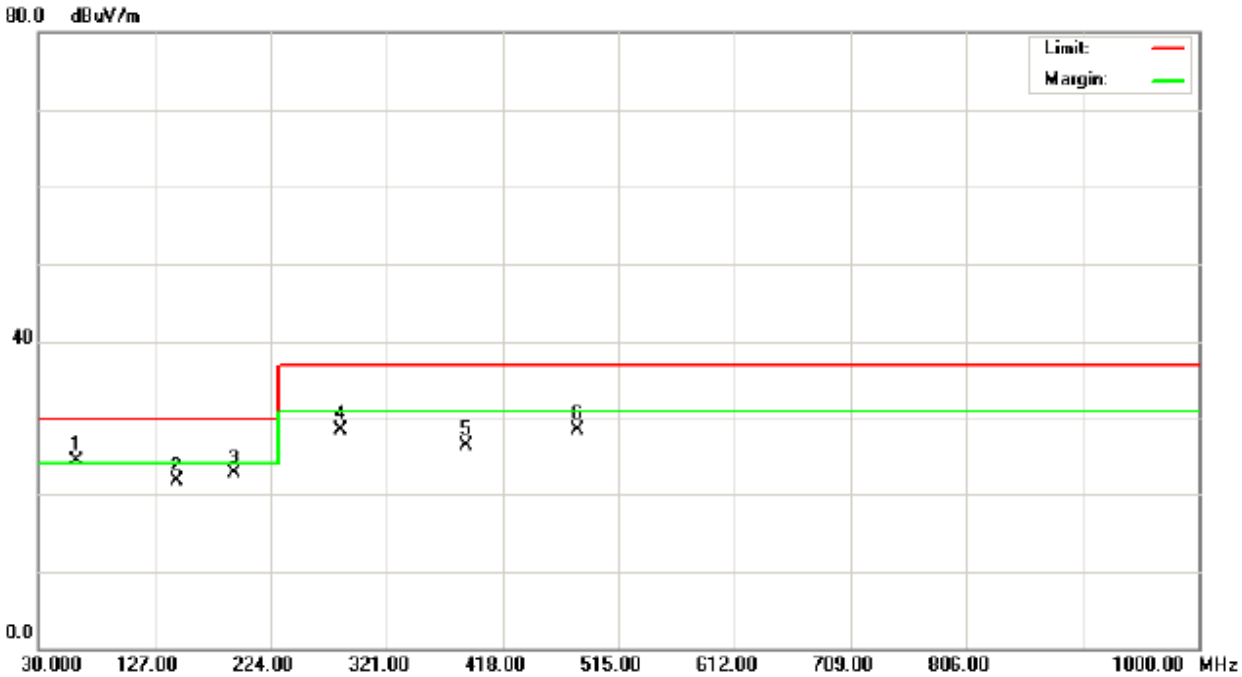
Remark：

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz。

(2) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(3) Measuring frequency range from 30MHz to 1000MHz。

(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table。



5. EUT TEST PHOTO

Radiated Measurement Photos