

FCC ID TEST REPORT

According to

FCC Part 15 Subpart C, Intentional Radiators

EUT Type **RF Optical Mouse**

Transmitter (TX) **1) Model No.: AM-2200UP, AM-2200U**
2) FCC ID: MNL220020040226

Applicant Name: **ADOMAX TECHNOLOGY CO., LTD.**

Address See the General Information for details.

Test Date : FEB. 27, 2004 Issued Date : MAR. 05, 2004

Test Engineer : JASON KUNG NVLAP Signature : Peter Kao
Peter Kao / Director

- The test report shall not be reproduced except in full, without the written approval of the “PEP”
- The report must not be used by the client to claim product endorsement by NVLAP or any agency of the United States government.
- This report is applicable only for EUT Model which described in page 4 .
- The testing result in this report are traceable to national or international standard .

PEP TESTING LABORATORY

12-3Fl, No. 27-1, Lane 169, Kang-Ning St., Hsi-Chih,

Taipei Hsien, Taiwan, R. O. C.

Tel : 886-2-26922097 Fax : 886-2-26956236

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1. General Information

Measurement of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC Part 2 and 15.

Applicant Name/Address: ADOMAX TECHNOLOGY CO., LTD.

**5F/2, NO. 192, CHUNG HSIN ROAD, SECTION 2, HSIN
TIEN CITY 231, TAIPEI HSIEN, TAIWAN, R. O. C.**

Contact Person: TONY YANG / DEVELOPMENT ENGINEER

Phone No.: 886-2-29160989 Fax No.: 886-2-29110077

**Manufacturer Name/Address: MAXLAND ELECTRONIC INDUSTRIAL CO., (ZQ)
LTD.**

**EAST SIDE OF QIANCUN, YINGBIN ROAD,
ZHAOQING, GUANGDONG, CHINA**

✧ Regulation: FCC Part 2 and 15

✧ Limitation: Part 15, Section 15.227, 15.207 and 15.209

✧ Test Procedure: ANSI C63.4-1992

✧ Place of Test: PEP Testing Laboratory

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Taipei Hsien, Taiwan, R. O. C.

TEL : 886-2-26922097 FAX : 886-2-26956236

FCC ID: MNL220020040226

2. Product Information

- a. EUT Type: RF Optical Mouse
- b. Transmitter Model: AM-2200UP
- c. TX FCC ID: MNL220020040226
- d. TX Channel No. : One
- e. TX Working Freq. : 27.045 MHz
- f. TX Modulation : N/A
- g. TX Crystal / Osc. : 76.8 KHz, 18.432 MHz, 27.042MHz
- h. TX Port(s) : N/A
- i. TX Transmitting Power : DC 3V (1.5V × 2)
- j. TX Power Supply : Battery(Type AA)
- j. TX Case : ABS
- k. EUT Condition : ☐ Prototype ☒ Engineering ☐ Production
- l. EUT Received Date : FEB. 24, 2004

3. EUT Description and Test Methods

- (A) The EUT is RF Optical Mouse, FCC ID: MNL220020040226, model AM-2200UP and AM-2200U. These two model models have fully identical electrical design and construction except that additional USB-to-PS2 adaptor is attached to receiver unit of model AM-2200UP. From technical point of view, we only tested model AM-2200UP. After preliminary test respectively on EUT operational condition with receiver connected to PC USB port and with receiver connected to PC PS2 port, we took the worst-case test mode, USB mode, for final test. The EUT that comes with a scroll wheel and two buttons is optical wireless mouse. DC 3V from two batteries (size AA, DC1.5V) are required to operate EUT. The radio frequency of EUT is 27.045MHz. For more detail information about the EUT, please refer to the user's manual.
- (B) Test Method: According to the major function designed, the EUT receiver was connected to PC USB port. All corresponding peripherals including PS2 keyboard, modems, printer, monitor to PC I/O ports and EUT placement were set to comply with ANSI C63.4 requirement. The test was carried out on EUT operational condition of continuously delivering signal to its receiver on PC USB port and the worst-case test result was recorded and provided in this report.
- (C) At the frequencies where the peak values of the emission exceeded the quasi-peak limit, the emissions were also measured with the quasi-peak detectors. The average detector also measured the emission either (A) quasi-peak values were under quasi-peak limit but exceeded average limit, or (B) peak values were under quasi-peak limit but exceeded average limit.

4. Modification(s):

N/A

5. Test Software Used

(A) EMITEST program that continuously generates a complete line of repeating “H” letter was the software used during test.

6. Support Equipment Used

1. Personal Computer (PC3)

CPU : Intel P4 Socket 478 1.6GHz

FCC ID : Declaration of Conformity(DoC)

Manufacturer : LEMEL

Model Number : LMIH1A2

Power Supply : Switching

Power Cord : Non-Shielded, Detachable, 1.8m

Data Cable : N/A

2. Monitor (MON1 15")

FCC ID : Declaration of Conformity(DoC)

Manufacturer : SAMSUNG

Model Number : 550S

Power Supply : Switching

Power Cord : Non-Shielded, Detachable, 1.8m

Data Cable : 1 > Shielded , Non-detachable,1.2m

2 > Back Shell : Metal

3. Printer (PRN1)

FCC ID : B94C2642X

Manufacturer : Hewlett-Packard

Model Number : C2642E

Power Supply : Linear, 30Vdc O/P

Power Cable : Non-Shielded , Detachable,1.8m

Data Cable : 1 > Shielded , Detachable,1.2m

2 > Back Shell : Metal

4. Modem (MOD1) x2

FCC ID : IFAXDM1414

Manufacturer : ACEEX

Model Number : 1414

Power Supply : Linear, 9Vac O/P

Power Cable : Non-Shielded , Detachable,1.7m

Data Cable : 1 > Shielded , Detachable,1m

2 > Back Shell : Metal

5. Keyboard (KBS1 PS/2)

FCC ID : E5XKB5121WTH0110

Manufacturer : BTC

Model Number : 5121W

Power Supply : +5Vdc from PS2 of PC

Power Cord : N/A

Data Cable : 1 > Shielded , Non-detachable,1.6m
2 > Back Shell : Metal

6. RF Optical Mouse(Receiver)

FCC ID : Declaration of Conformity(DoC)

Manufacturer : MAXLAND ELECTRONIC
INDUSTRIAL CO., (ZQ) LTD.

Model Number : AM-2200RX

Power Supply : +5Vdc from USB and PS2 of PC

Power Cord : N/A

Data Cable : 1 > Shielded , Non-detachable,1.5m
2 > Back Shell : Metal

7. Description of Conducted Emissions Test

7.1 Conducted Emissions

A 1m x1.5m wooden table 80 cm high is placed 40cm away from the vertical wall. Two AMN are bonded to the grounding plane. The EUT is powered from the designated AMN and the support equipment is powered from another designated AMN. Powers to the AMN are filtered by a high-current high insertion loss power line filters. All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2". All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the AMN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.

The spectrum was scanned from 150kHz to 30 MHz with 1.5 sec sweep time. The frequency producing the maximum level was re-examined using Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode. The bandwidth of the receiver was set to 10kHz. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; whichever determined the worst-case emission.

7.2 Conducted Emissions Limits

Frequency	Maximum RF Line Voltage dB(uV)			
	Class A		Class B	
MHz	QUASI-PEAK	AVERAGE	QUASI-PEAK	AVERAGE
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5.0	73	60	56	46
5.0 - 30	73	60	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

8. Description of Radiated Emissions Test

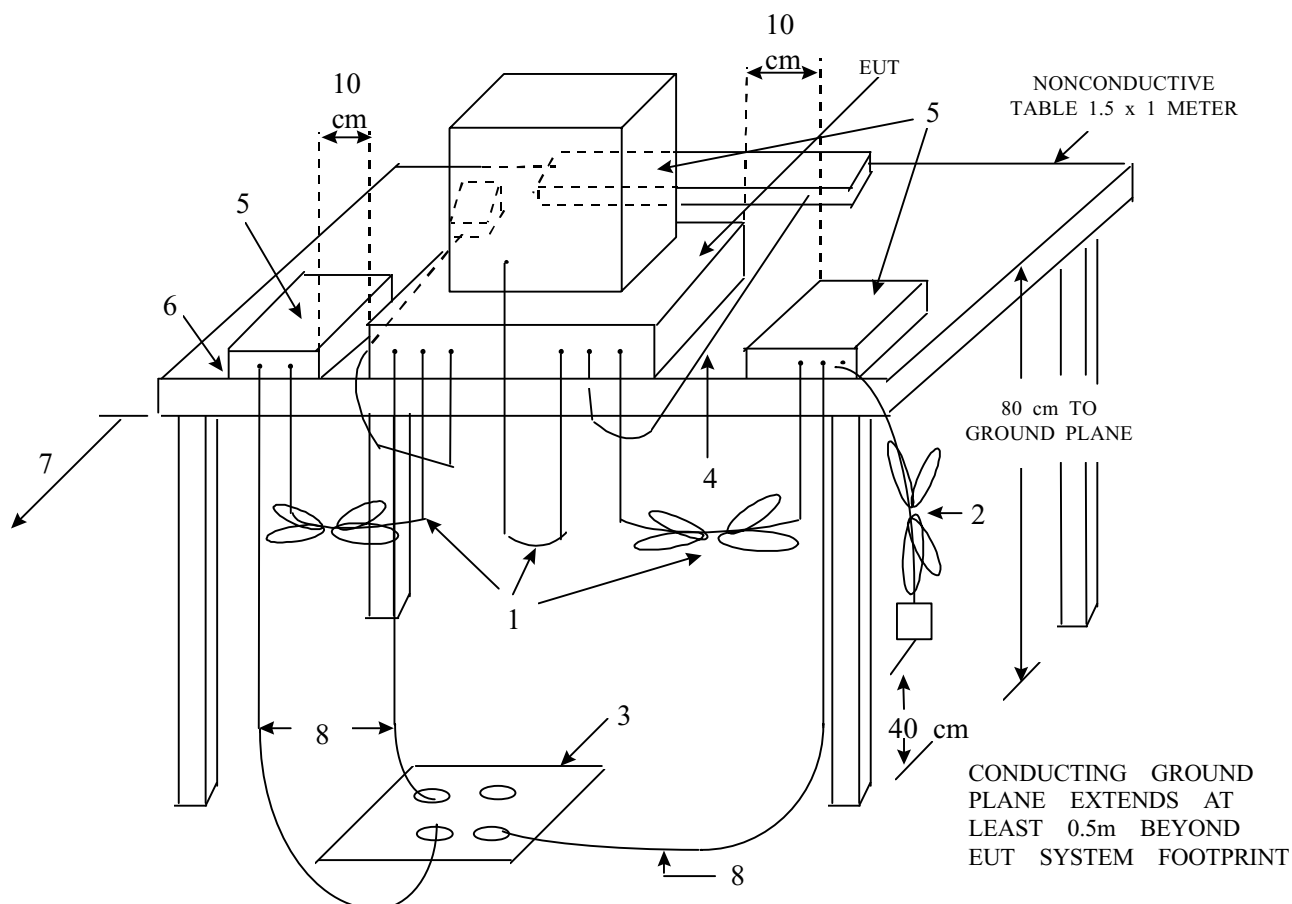
8.1 Radiated Emissions

Preliminary measurements were made indoors chamber at 3 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000 MHz using logbicon antenna. Above 1GHz, linearly polarized double ridge horn antenna was used.

Final measurements were made outdoors at 3-meter test range using logbicon antenna and horn antenna. The test equipment was placed on a wooden bench situated on a 1.5x1 meter area adjacent to the measurement area. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz.

The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet , if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in radiated emission test photo.

8.2 Test Configuration



LEGEND

1. Interconnecting cables which hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables which are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.
3. If LISN are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground if required, receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, KEYPADS, etc., have to be placed as close as possible to the controller.
5. Non-EUT components of EUT system being tested.
6. The rear of all components of the system under test shall be located flush with the rear of the table.
7. No vertical conducting wall used.
8. Power cords drape to the floor and are routed over to receptacle.

8.3 Radiated Emission Limits

Limits for radiated disturbance of
 Class B ITE or Intentional Radiator
 At a measuring distance of 3 m

Frequency MHz	Field Strength dB(μ V/m) or uV/m	
30 to 88	40	100
88 to 216	43.5	150
216 to 960	46	200
Above 960	56	500
NOTES 1 The lower limit shall apply at the transition frequency. 2 Additional provisions may be required for cases where interference occurs.		

9. Conducted Emissions Test Setup Photos

N/A

10. Conducted Emissions Test Data

The EUT is supplied by DC power source from batteries. The conducted powerline test is not applicable to EUT.

11. Radiated Emissions Test Setup Photos

< FRONT VIEW >



< REAR VIEW >



12. Radiated Emissions Test Data

Model No. : AM-2200UP

Frequency range : 30MHz to 1GHz

Detector : Quasi-Peak Value

Frequency range : above 1GHz

Detector : Quasi-Peak/Average Value

Temperature : 28° C

Humidity : 54 %

Memo : TX ON MODE

Antenna polarization : HORIZONTAL ; **Test distance** : 3m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (° angle)	Antenna High(m)
27.040	51.53	-28.47	80.00	49.18	21.73	0.62	20.00	150.0	4.0
243.416	33.51	-12.49	46.00	39.12	12.31	1.57	19.49	154.0	4.0
270.461	35.37	-10.63	46.00	39.76	13.25	1.77	19.41	271.0	4.0
838.296	40.79	- 5.21	46.00	34.19	22.68	3.12	19.20	199.0	3.5
892.382	42.33	- 3.67	46.00	34.54	24.00	3.01	19.22	85.0	3.5
919.427	41.75	- 4.25	46.00	33.53	24.18	3.10	19.06	218.0	3.5
973.505	39.99	-14.01	54.00	31.23	24.29	3.37	18.90	309.0	3.5

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

Model No. : AM-2200UP
Frequency range : 30MHz to 1GHz **Detector** : Quasi-Peak Value
Frequency range : above 1GHz **Detector** : Quasi-Peak/Average Value
Temperature : 28° C **Humidity** : 54 %
Memo : TX ON MODE

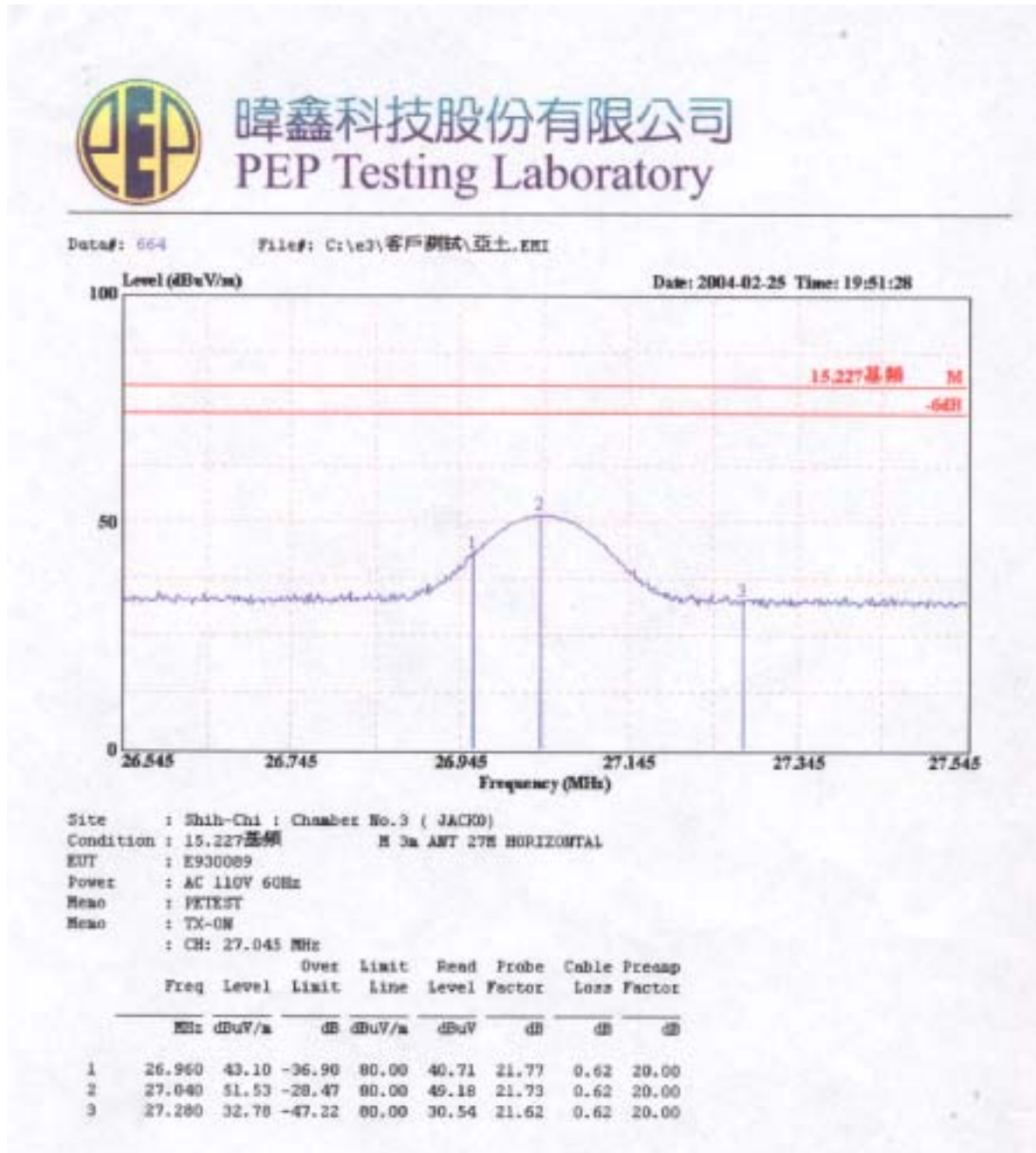
Antenna polarization : VERTICAL ; **Test distance** : 3m ;

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (°angle)	Antenna High(m)
27.040	46.81	-33.19	80.00	44.46	21.73	0.62	20.00	200.0	1.0
57.744	30.59	- 9.41	40.00	40.52	9.17	0.66	19.76	213.0	1.0
126.660	34.96	- 8.54	43.50	45.38	8.33	1.02	19.77	296.0	1.0
624.059	36.12	- 9.88	46.00	31.82	21.10	2.63	19.43	158.0	1.5
792.158	38.14	- 7.86	46.00	31.92	22.10	3.16	19.04	328.0	1.5
824.233	39.41	- 6.59	46.00	32.99	22.40	3.15	19.13	142.0	1.5
919.415	39.09	- 6.91	46.00	30.87	24.18	3.10	19.06	95.0	1.5

Note :

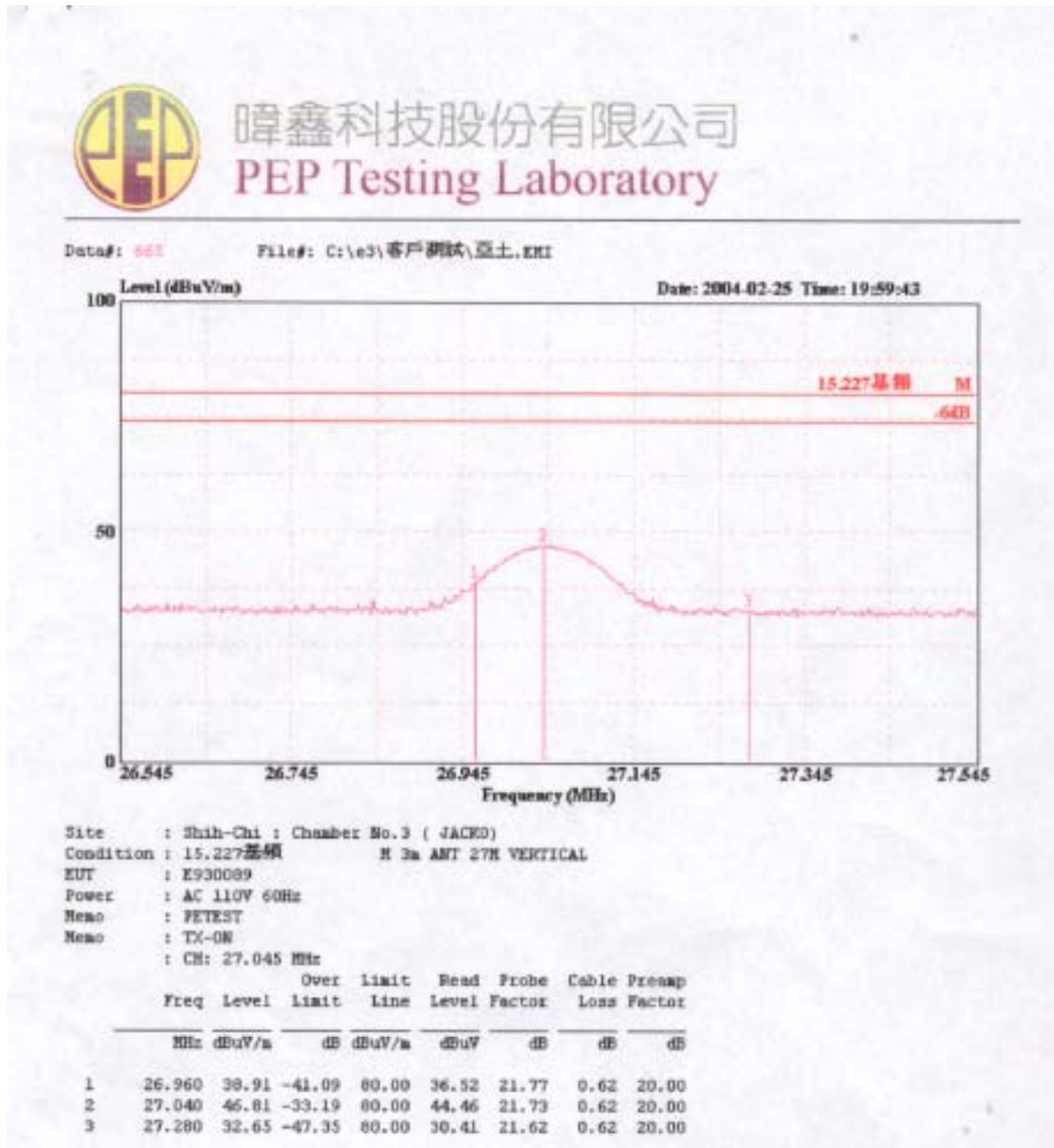
1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

13. Occupied Bandwidth Plot Data



RBW = 120 KHz

VBW = 300 KHz



RBW = 120 KHz

VBW = 300 KHz

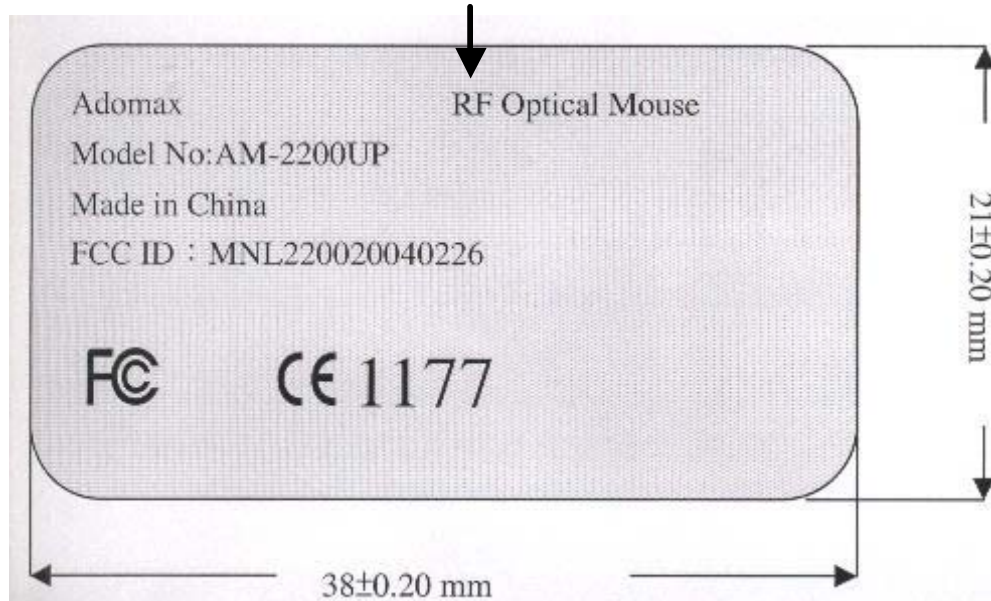
14. List of Measured Instruments

Test Mode	Instrument	Model No.	Serial No.	Next Cal. Date	Cal. Interval
Radiation (OP No.1)	R & S Receiver	ESVS30	863342/012	May 22, 2004	1Year
	Schaffner Pre-amplifier	CPA9232	1028	May 20, 2004	1Year
	COM-Power Horn Ant.	AH-118 (1GHz~18GHz)	10095	May 21, 2005	2Year
	Schwarzbeck Precision Dipole Ant	VHAP (30MHz~1GHz)	970 + 971 953 + 954	June 26, 2006	3Year
	R &S Signal Generator	SMY01	841104/037	Apr. 29, 2005	2Year
	RF Cable	No. 1	N/A	May 11, 2004	1Year
	EMCO Antenna	3142B (26MHz~2GHz)	9904-1370	Aug. 24, 2004	1Year
Chamber (No. 3)	Spectrum Analyzer	FSP 3GHz	833387/010	Aug. 30, 2003	1Year
	Pre-Amplifier	CPA-9232	1027	Feb. 24, 2004	1Year
	Antenna	VULB9160	3074	Jul. 24, 2004	1Year
	Signal Generator	SMY02	829846/0358	Jan. 29, 2005	2Year
	RF Cable	NO.3	N/A	Feb. 19, 2004	1Year
	HORN ANTENNA	AH-118	10095	Jul. 24, 2004	1Year

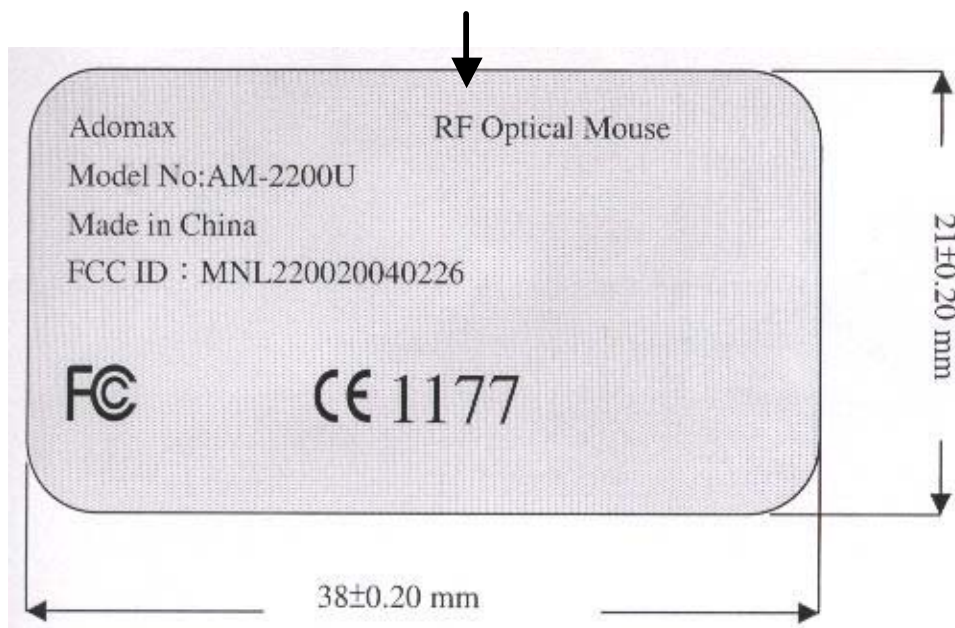
15. FCC ID Label Sample

The sample label shown below shall be permanently affixed at a conspicuous location on the device, instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practicable, only the trade name, model number, and the FCC logo must be displayed on the device per Section §15.19 (b)(2).

EUT Label A



EUT Label B



16. Information To The User

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures :

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver .
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected .
- Consult the dealer or an experienced radio / TV technician for help .

17. EUT External Photos

PHOTO. 1. EUT (TX) FRONT VIEW



PHOTO. 2. EUT (TX) REAR VIEW



18. EUT Internal Photos

PHOTO. 3. EUT (TX) INSIDE VIEW



PHOTO. 4. EUT (TX) INSIDE VIEW



PHOTO. 5. EUT (TX) COMPONENT SIDE VIEW



PHOTO. 6. EUT (TX) SOLDERING SIDE VIEW

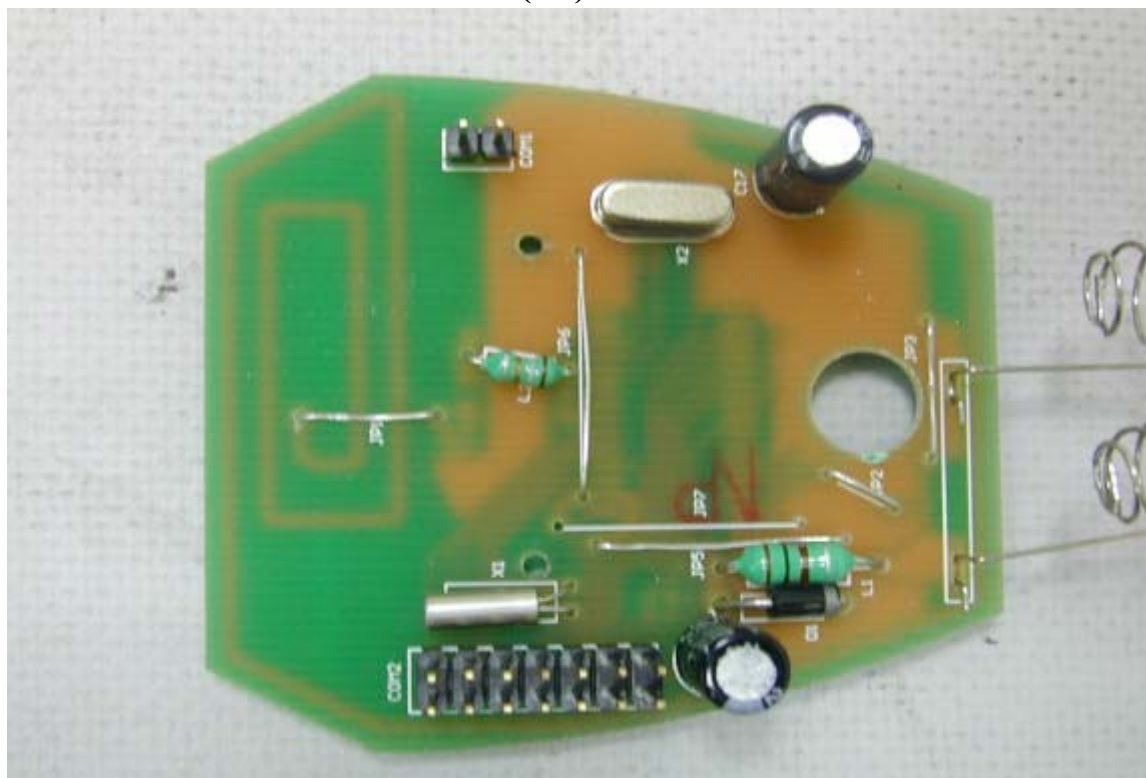


PHOTO. 7. EUT (TX) COMPONENT SIDE VIEW

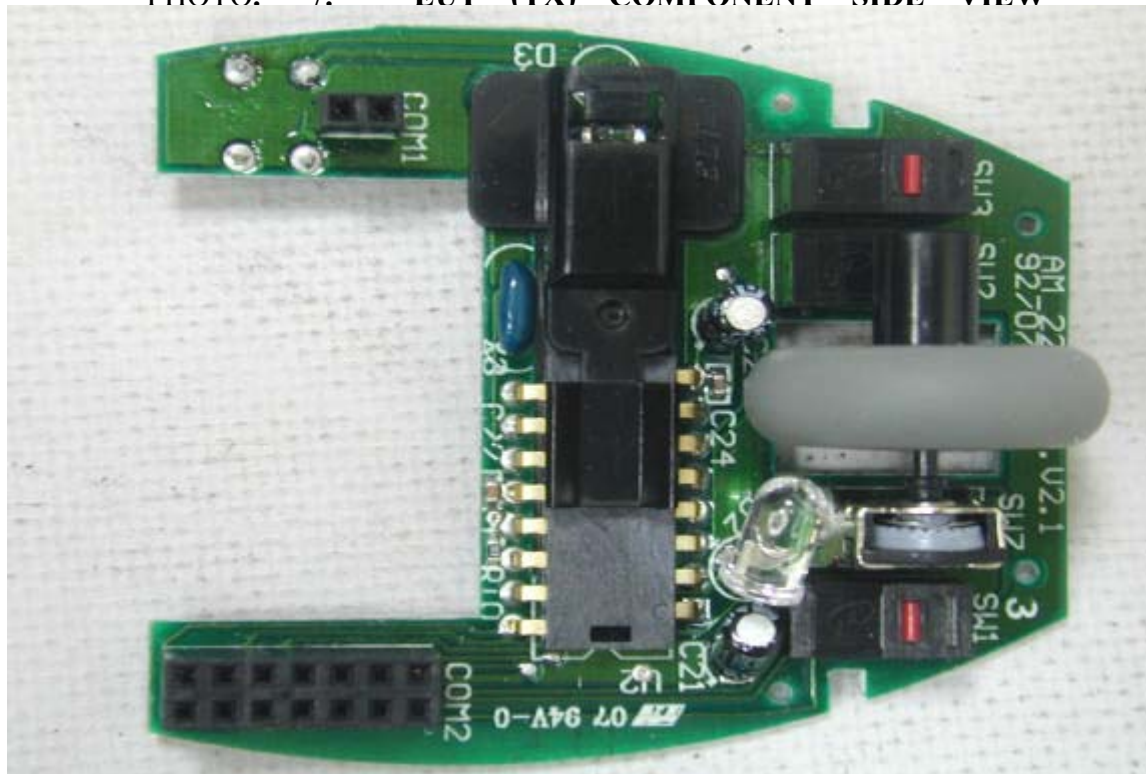


PHOTO. 8. EUT (TX) SOLDERING SIDE VIEW

