PEP Testing Laboratory

RFI / EMI TEST REPORT

APPLICANT	:	ULTIMA ELECTRONICS CORP.
E. U. T.	:	MOUSE
TRADE NAME	:	N/A
FCC ID	:	ITEUECUM990
REGULATION	:	CFR 47 , Part 15 Subpart B , **Class B**
TEST SITE	:	PEP Testing Laboratory
TEST ENGINEER	:	Jiwon Gong
TEST DATE	:	8 / 17 / 1998
ISSUED DATE	:	AUG. / 27 / 1998
REPORT No.	:	980447

PEP Testing Laboratory

VERIFICATION

WE HEREBY VERIFY THAT:

The E. U. T. listed below has completed RFI testing by PEP Testing Laboratory and the interference emissions can pass **FCC Class B** limitations.

The tested configurations and the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992.

Any data in this RFI report is " **reference** " only.

APPLICANT : **ULTIMA ELECTRONICS CORP. ***
PRODUCT : **MOUSE ***
FCC ID : **ITEUECUM990 ***
MODEL : **UM990 ***

M. Y. TSUI
Manager

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TABLE OF CONTENTS

1. GENERAL

1.1 GENERAL INFORMATION:

APPLICANT : ULTIMA ELECTRONICS CORP.

7F, NO. 100, LI DE CHUNG HO CITY, TAIPEI HSIEN, TAIWAN R. O. C.

MANUFACTURER : ULTIMA ELECTRONICS CORP.

7F, NO. 100, LI DE CHUNG HO CITY, TAIPEI HSIEN, TAIWAN R. O. C.

MEASUREMENT PROCEDURE : ANSI C63 , 4 - 1992

TESTED FOR COMPLIANCE WITH : Title 47 of CFR Part 15 , Subpart B , Class B

1.2 PLACE OF MEASUREMENT

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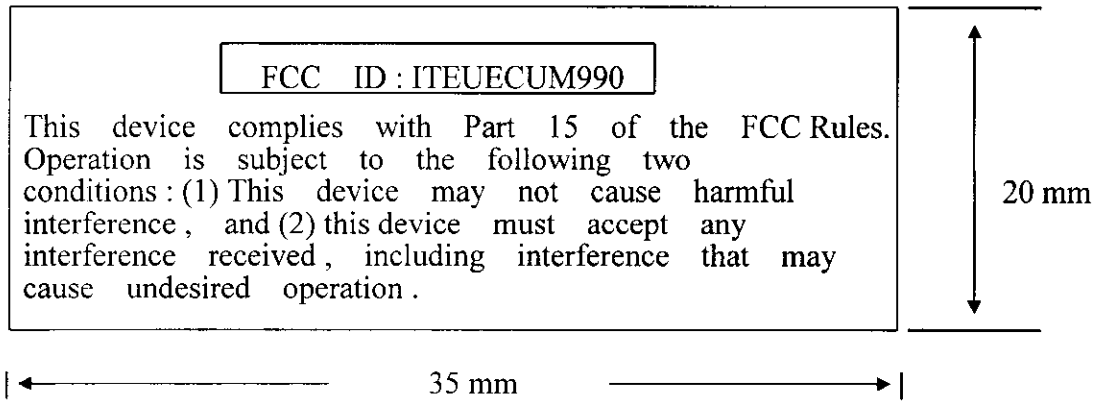
1.3 LABELING REQUIREMENT

A FCC ID label shall be permanently attached and conspicuously located on the equipment :



1.4 INFORMATION TO THE USER

The following FCC statement should be declared in a conspicuous location in the user's 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.

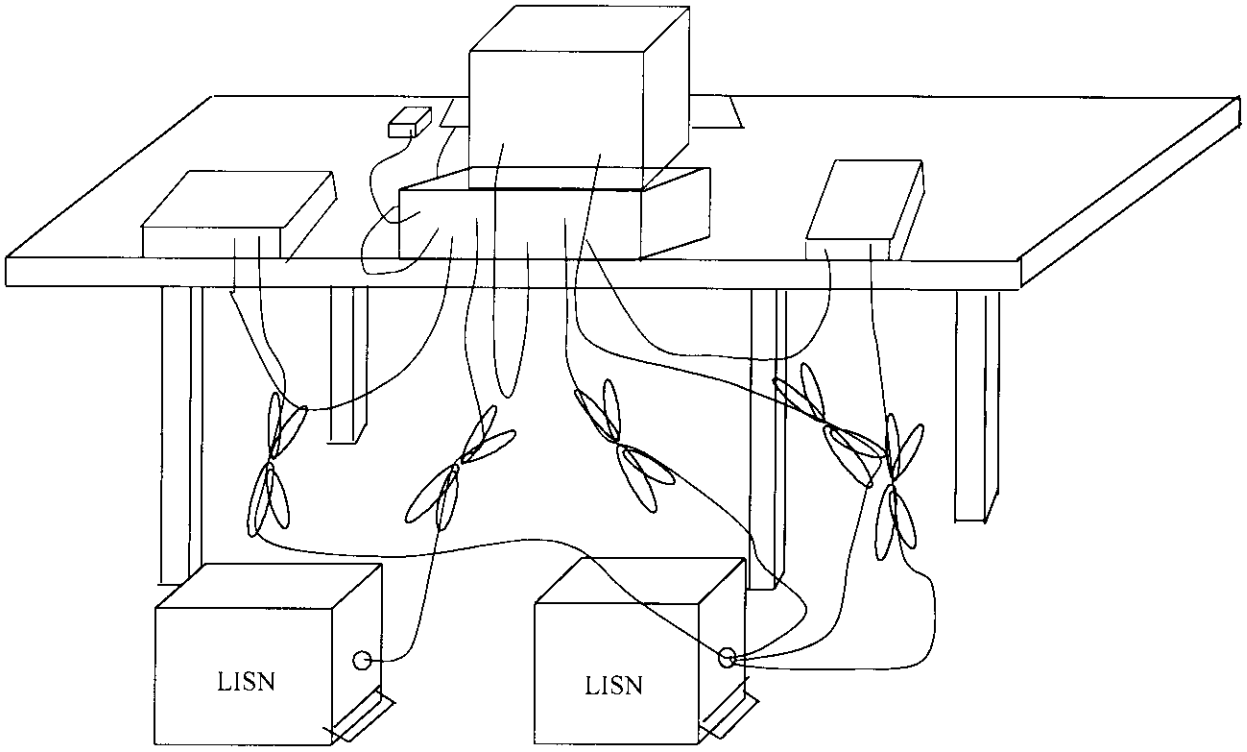
Warning : A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

Use only shielded cables to connect I/O devices to this equipment.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

2. CONDUCTION EMISSIONS TEST

2.1 GENERAL SETUP OF THE TEST FACILITIES



2.2 TEST PROCEDURES

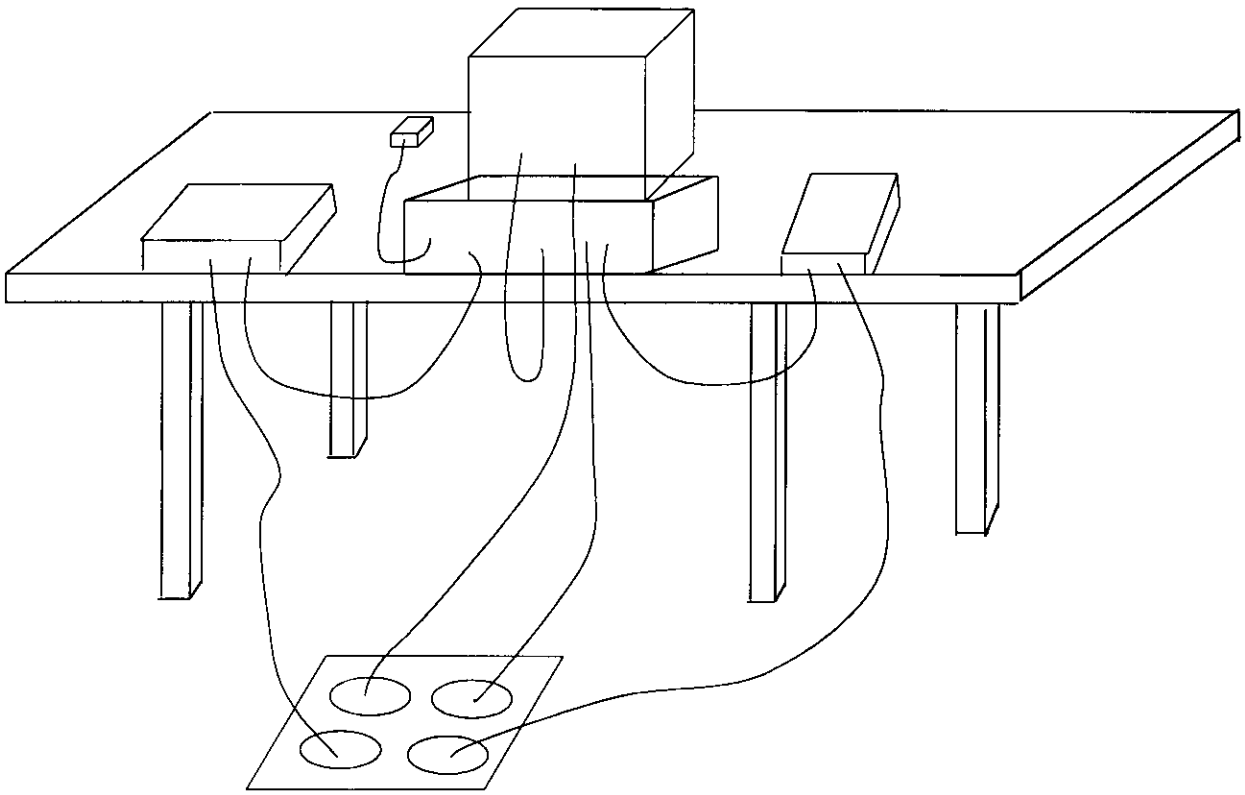
The system was setup as described above, with the EMI diagnostic software.
Both the line of power cord, hot and neutral, were run with the EMI tests software.

To get the maximum power line conducted emission, we changed the configuration by varying the monitor power cord fed from floor outlet and from the outlet on the power supply of this computer.

The highest emissions were recorded in the RFI test report.

3. RADIATED EMISSIONS TEST

3.1 GENERAL SETUP OF THE FACILITIES



3.2 TEST PROCEDURES

Radiated emissions test was carried out by **PEP Testing Laboratory** at the open field test site authorized by FCC.

The EUT and supporting equipments were setup with the EMI diagnostic software.

a. setting up the EUT under normally position, and scanning it from 30 MHz to 1000 MHz, then recording those narrow band noises which cannot be 6 dBuV below lower bound. Both horizontal and vertical antenna are measured from 1 meter height to 4.0 meter height, and turntable rotate 360 degrees.

b. fixing the EUT rear face to antenna and antenna 1.0 meter height. We adjusted I/O cables to find the highest coupling noise and moved the height of antenna from 1 to 4 meters, then rotated the turntable simultaneously.

c. checking following step b. all points which were recorded in step a.

d. changing the peripherals position, and routine steps a. b. c.

The highest emissions were recorded in the RFI test report.

4. DESCRIPTION FOR EUT TESTING CONFIGURATION

** **TEST PROCESURE** - - - -

(A) The EUT was 2 keys PC mouse model No. UM990 , for more detail information about the EUT , please refer user's manual .

(B) The EUT was inserted into RS232 port on PC and designated as COM.1 , PC system and EUT were enable by FCC EMI test program , the data cable of the mouse put as close as on the right side of the PC and on the left side of the PC during pre-scan , on the right side will be worse case than on the left side ; therefore , the worst case data were in this RFI report .

(C) After the EUT was set up , we did the conducted emission test in the shielded room and the worst case placement finding as the ANSI C63.4 requirement ; similarly , the radiated emission test was done at the open field site .

(D) If the peak value of the noise can't under Non-consumer equipment limit 3 dBuV more , we'll change Biconical antenna or Log-periodic antenna for Dipole antenna and record its Quasi-Peak value , making sure it can under 6 dBuV at least .

(E) In the RFI test report , we provided the worst conducted emission testing data in page C-1.*
For the radiated emission test , the worst data recorded in the page R-1.*

** **I / O DATA CABLES INFORMATIONS** - - -

Please refer the page 9 .

5. SUPPORTING DEVICES TO TEST

SUPPORT UNIT 1. ---- PERSONAL COMPUTER

Manufacturer : Jm Computer Inc.
Model Number : C486SDX-SDT
Power Supply Type : Switching
Power Cord : Shielded, Detachable, 1.2m
Data Cable : Shielded, Detachable, 1.2m
FCC ID : K25C486SDX-SDT

SUPPORT UNIT 2. ---- MONITOR

Manufacturer : Acer Peripherals Inc.
Model Number : 7134T
Power Supply Type : Switching
Power Cord : Shielded, Detachable, 1.2m
Data Cable : Shielded, Undetachable, 1m
FCC ID : JVP7134T

SUPPORT UNIT 3. ---- PRINTER

Manufacturer : Hewlett-Packard Singapore Pte Ltd.
Model Number : HP 2225C+
Power Supply Type : Linear
Power Cord : Non-Shielded, Detachable, 1.2m
Data Cable : Shielded, Detachable, 1m. 2464
FCC ID : DSI6XU2225

SUPPORT UNIT 4. ---- MODEM

Manufacturer : ACEEX

Model Number : 1414

Power Supply Type : Linear

Power Cord : Non-Shielded, Detachable, 1.2m

Data Cable : Shielded, Detachable, 1m

FCC ID : IFAXDM1414

SUPPORT UNIT 5. ---- KEYBOARD

Manufacturer : Acer Peripherals Inc.

Model Number : 6311-KW

Power Supply Type : N/A

Power Cord : N/A

Data Cable : Shielded, Undetachable, 1.2m

FCC ID : JVPKBS-WIN

EQUIPMENT UNDER TEST ----MOUSE

Manufacturer : ULTIMA ELECTRONICS CORP.

Model Number : UM990

Data Cable : Shielded, Undetachable, 1.2m

FCC ID : ITEUECUM990

6. TEST CONFIGURATION

Radiated emission detector function :

(1) 30MHZ~1GHZ : Quasi-Peak Value
Resolution BW : 120KHZ Video BW : 300KHZ

(2) above 1GHZ : Quasi-Peak value and Average Value
Resolution BW : 1MHZ Video BW : 1MHZ
*** either Q. P. or average value will be recorded in the report**

Conducted emission detector function :

(1) 450KHZ~30MHZ : Quasi-Peak Value
Resolution BW : 9KHZ Video BW : 30KHZ

The else descriptions : N/A

Conducted Emission Test Photo. : Page C-1
Test Data : Hot C-1.1
Neutral C-1.2

Radiated Emission Test Photo. : Page R-1
Test Data : Horizontal R-1.1
Vertical R-1.2

CONDUCTED TEST CONFIGURATION PHOTO.

< FRONT VIEW >

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CONDUCTED EMISSIONS TEST DATA

Note : HOT LINE TEST

Freq. (MHz)	Level (dB)	Over Limit (dB)	Limit Line (dB)	Read Level (dB)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)
1.750	33.68	-14.32	48.00	31.81	0.10	1.77	0.00
3.316	27.62	-20.38	48.00	25.65	0.17	1.80	0.00
5.385	27.85	-20.15	48.00	25.70	0.30	1.85	0.00
6.478	26.31	-21.69	48.00	24.10	0.36	1.85	0.00
7.808	24.90	-23.10	48.00	22.63	0.42	1.85	0.00
15.580	28.64	-19.36	48.00	26.03	0.71	1.90	0.00
17.205	31.03	-16.97	48.00	28.34	0.75	1.94	0.00
18.150	32.03	-15.97	48.00	29.31	0.77	1.95	0.00

Note :

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

CONDUCTED EMISSIONS TEST DATA

Note : NEUTRAL LINE TEST

Freq. (MHz)	Level (dB)	Over Limit (dB)	Limit Line (dB)	Read Level (dB)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)
1.750	37.20	-10.80	48.00	35.33	0.10	1.77	0.00
3.316	35.06	-12.94	48.00	33.09	0.17	1.80	0.00
3.907	36.46	-11.54	48.00	34.46	0.20	1.80	0.00
5.385	33.78	-14.22	48.00	31.63	0.30	1.85	0.00
6.419	37.67	-10.33	48.00	35.47	0.35	1.85	0.00
7.808	32.31	-15.69	48.00	30.04	0.42	1.85	0.00
14.752	33.69	-14.31	48.00	31.10	0.69	1.89	0.00
17.796	34.89	-13.11	48.00	32.18	0.76	1.95	0.00
25.242	31.03	-16.97	48.00	27.94	0.93	2.16	0.00

Note :

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

PEP Testing Laboratory

RADIATED EMISSIONS TEST DATA

Antenna polarization : HORIZONTAL ; Test distance : 3 m ;

Freq. (MHz)	Level (dB)	Over Limit (dB)	Limit Line (dB)	Read Level (dB)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)
96.640	24.65	-18.85	43.50	43.38	-0.37	1.63	20.00
120.440	21.15	-22.35	43.50	37.55	1.65	1.95	20.00
168.380	23.64	-19.86	43.50	38.11	3.13	2.40	20.00
181.640	27.06	-16.44	43.50	40.33	4.30	2.43	20.00
188.440	28.58	-14.92	43.50	41.46	4.59	2.53	20.00
201.600	27.91	-15.59	43.50	40.68	4.52	2.71	20.00
217.600	29.16	-16.84	46.00	44.47	1.84	2.85	20.00
227.200	29.01	-16.99	46.00	44.81	1.28	2.92	20.00
335.200	24.59	-21.41	46.00	37.67	3.21	3.72	20.00
529.600	26.96	-19.04	46.00	35.66	6.64	4.65	20.00

Note :

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

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RADIATED EMISSIONS TEST DATA

Antenna polarization : VERTICAL ; Test distance : 3 m ;

Freq. (MHz)	Level (dB)	Over Limit (dB)	Limit Line (dB)	Read Level (dB)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)
48.190	25.57	-14.43	40.00	44.66	-0.15	1.06	20.00
92.390	22.72	-20.78	43.50	42.06	-0.88	1.54	20.00
120.440	23.74	-19.76	43.50	40.14	1.65	1.95	20.00
147.640	26.01	-17.49	43.50	42.48	1.26	2.28	20.00
175.690	28.18	-15.32	43.50	42.08	3.70	2.40	20.00
188.440	28.91	-14.59	43.50	41.79	4.59	2.53	20.00
217.600	28.02	-17.98	46.00	40.93	4.24	2.85	20.00
227.200	25.34	-20.66	46.00	38.14	4.28	2.92	20.00
335.200	25.14	-20.86	46.00	35.22	6.21	3.72	20.00
401.600	24.29	-21.71	46.00	32.26	8.12	3.91	20.00

Note :

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

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List of Test Equipment

Instrument	Model No.	Cal. Due Date	S/N
R&S Receiver	ESVS30(30M~1GHZ)	Apr. 21, 1999	863342/012
R&S Receiver	ESBI (20~5GHZ)	Feb. 12, 1999	845658/003
Spectrum Analyzer	HP8591A(9K~1.8GHZ)	Jan. 31, 1999	3225A03039
Spectrum Analyzer	R3261A (9K~2.6GHZ)	Dec. 03 1998	91720076
EMCO L.I.S.N.	3825/2 (10K~30MHZ)	Oct. 31, 1998	9311-2150
L.I.S.N.	KNW-242(10K~30MHZ)	Jan. 31, 1999	8-837-7
R & S L.I.S.N.	ESH3-Z5(9K~30MHZ)	Feb. 12, 1999	844982/039
Anritsu Pre-Amp.	MH648A(100K~1.4GHZ)	Nov. 9, 1998	M40076
R & S Pre-Amp.	ESMI-Z7(20M~7GHZ)	Feb. 12, 1999	6/2278/011
Chase bi-Log Antenna	CBL6111B(30M~1GHZ)	Aug. 05, 1998	1968
COM-Power Horn Antenna	AH-118 (1G~18GHZ)		10056
EMCO Dipole Antenna	3121C (20M~1GHZ)	May. 22, 1999	9611-1230
EMCO Biconical Antenna	3110B (30M~300M)	Mar. 10, 1999	2932
EMCO Log-Periodic Antenna	3146A (300M~1GHZ)	Apr. 14, 1999	1384