

Exhibit C - Measurement Report

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# ELECTROMAGNETIC INTERFERENCE TEST REPORT

Company : Logitech Far East Ltd.  
 Address : NO.2,Creation Rd. 4, Science-Based Industrial Park, Hsinchu  
Taiwan, R.O.C.  
 Sample Name : Mouse  
 Model : 177220721  
 Data Applies To : 177220711, M-SAT SONY2  
 Date Received : MAR. 22, 1999  
 Date Tested : MAR. 28, 1999

## MEASUREMENT PROCEDURE USED :

CISPR 22, CLASS B, 1996  
 FCC RULE PART 15, 1996

WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.

	Name	Signature	Date
Testing Engineer	C.F.Wu/NVLAP	C. F. Wu	Apr. 02, 1999
Approving Manager	Paul Y. Liao/NVLAP	Paul Y. Liao	Apr. 03, 1999

### Notes :

1. This report will be invalid if duplicated or photocopied in part.
2. This report refers only to the specimen(s) submitted to test, and is invalid as separately used.
3. This report is invalid without examination stamp and signature of this institute.
4. The tested specimen(s) will be preserved for thirty days from the date issued.
5. This is a NIST/NVLAP accredited report but not constituted and endorsed by US government.



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## **1. GENERAL INFORMATION**

### **1.1 DESCRIPTION OF EUT & POWER**

MANUFACTURER : Logitech Far East Ltd.

SAMPLE NAME : Mouse

MODEL NUMBER : 177220721

POWER SUPPLY : DC5V(from PC)

SIGNAL CABLE : (A) shielded , 56cm for 177220711  
(B) shielded , 180cm for 177220721



## 1.2 DESCRIPTION OF PERIPHERALS

### (1) PC

MODEL NUMBER : KAYAK XU 6/300  
SERIAL NUMBER : SG82100177  
MANUFACTURER : HP CORP.  
F.C.C. ID : B94VECTRAXU6WT  
POWER CORD : Unshielded , Detachable , 1.8m

### (2) MONITOR

MODEL NUMBER : JC-1571VMA-2  
SERIAL NUMBER : 6Z01162EA  
MANUFACTURER : NEC CORP.  
F.C.C. ID : A3DJC-1571VMA-2  
POWER CORD : Unshielded , Detachable , 1.8m

### (3) KEYBOARD

PRODUCT NUMBER : SK-2501K  
SERIAL NUMBER : M980167956  
MANUFACTURER : HP CORP.  
F.C.C. ID : GYUR38SK

### (4) PRINTER

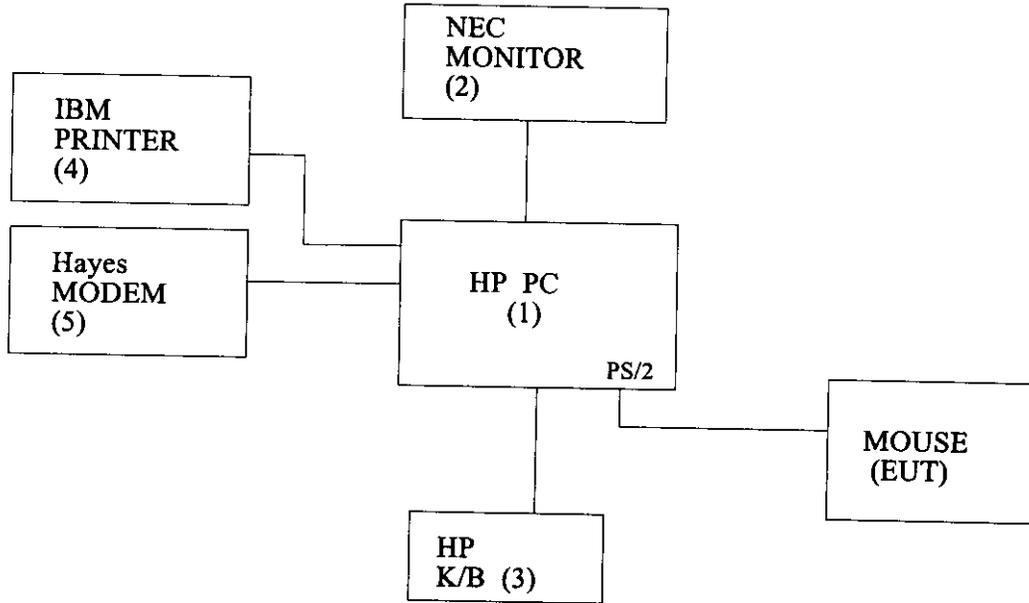
MODEL NUMBER : 5152-002  
SERIAL NUMBER : 0754365  
MANUFACTURER : IBM CORP.  
F.C.C. ID : BKM9A85152002

### (5) MODEM

MODEL NUMBER : 5240AM  
SERIAL NUMBER : A0095240K270  
MANUFACTURER : Hayes CORP  
F.C.C. ID : BFJ5201AM



### 1.3 EUT & PERIPHERALS SETUP DIAGRAM



The indicated numbers (1)(2)-----please refer to item 1.2.



## 1.4 EUT OPERATING CONDITION

1. Setup whole system for test as shown on setup diagram.
2. Get into windows 98 operating system.
3. Run "EMITEST.EXE" program.
4. Select "Item 0" to run all test.
5. Start testing.

## 1.5 DESCRIPTION OF TEST SITE

SITE DESCRIPTION : FCC certificate NO. :31040/SIT  
DNV certificate NO. : 510-96-1016  
TUV certificate NO. :I9664582-9610  
Lloyd's certificate NO. :LA003  
BCIQ certificate NO. :SL2-IN-E-02  
NVLAP Lab code : 200118-0  
CNLA certificate NO. :CNLA-ZL97018  
VCCI certificate NO. :R-706, C-650

NAME OF SITE : Electronics Research & Service Organization  
Industrial Technology Research Institute

SITE LOCATION : K500, 195-4 , sec. 4, Chung Hsing Rd.,  
Chu-Tung Chen. Hsin-Chu, Taiwan 31015 R.O.C.



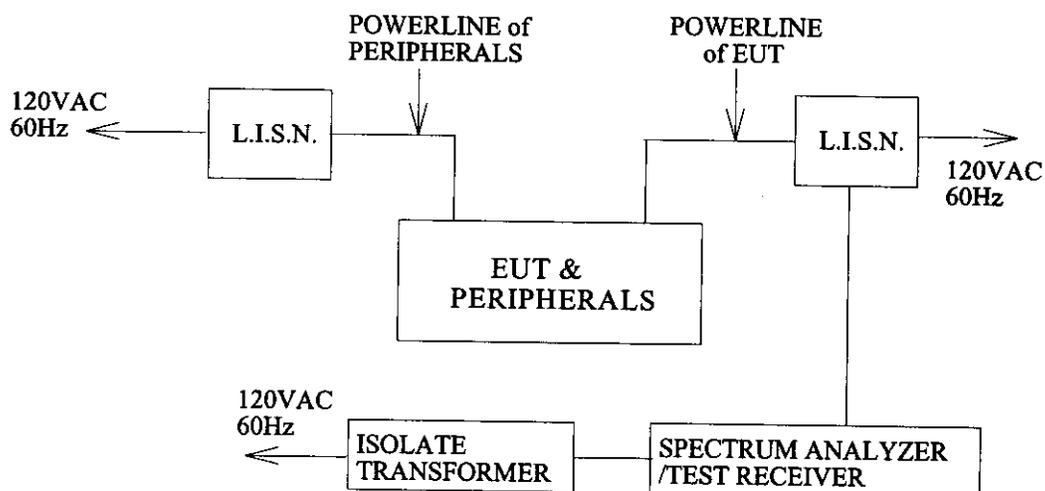
## 2. CONDUCTED POWERLINE TEST

### 2.1 TEST EQUIPMENTS

The following test equipments are used during the conducted powerline tests :

MANUFACTURER OR TYPE	MODEL No	SERIAL NO.	DATE OF CALIBRATION
SPECTRUM ANALYZER & DISPLAY	HP 8568A	2235A02320	MAR. 18, 1999
QUASI-PEAK ADAPTER	HP 85650 A	2341A00672	MAR. 18, 1999
ISOLATION TRANSFORMER	SOLAR 7032-1	N/A	N/A
L.I.S.N.	EMCO 3850/2	9311-1025 9401-1028	MAR. 25. 1999
TEST RECEIVER	R/S ESH3	8720791118	MAR. 18, 1999
SHIELDED ROOM	KEENE 5983	N/A	N/A

### 2.2 TEST SETUP





## 2.3 CONDUCTED POWER LINE EMISSION LIMIT

FREQUENCY (MHz)	MAXIMUM RF LINE VOLTAGE (dB $\mu$ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

## 2.4 TEST PROCEDURE

The test procedure is performed in a 12ft $\times$ 12ft $\times$ 8ft(L $\times$ W $\times$ H) shielded room. the EUT along with its peripherals were placed on a 1.0m(W) $\times$ 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chasis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chasis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

## 2.5 UNCERTAINTY OF CONDUCTED EMISSION

The uncertainty of conducted emission is  $\pm 1.36$ dB.



## 2.6 LINE CONDUCTED RF VOLTAGE MEASUREMENT

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are Quasi-peak values.

Temperature : 24°C

Humidity : 50% RH

FREQUENCY (MHz)	READING(dB $\mu$ V)				LIMITS (dB $\mu$ V)	
	ONE END & GRD'D		THE OTHER END & GRD'D		Q.P.	Ave.
	Q.P.	Ave.	Q.P.	Ave.		
0.150	*	*	*	*	66.00	56.00
0.164	49.55	*	50.45	*	65.25	55.25
0.252	40.27	*	42.57	*	61.69	51.69
0.885	36.53	*	37.03	*	56.00	46.00
3.207	41.29	*	*	*	56.00	46.00
3.241	*	*	45.49	*	56.00	46.00
5.005	*	*	41.01	*	60.00	50.00
17.199	44.17	*	*	*	60.00	50.00
24.922	34.69	*	33.39	*	60.00	50.00
30.000	*	*	*	*	60.00	50.00

REMARKS : 1. \* Undetectable or the Q.P. values is lower than the limits of Ave  
 2. For 177220721



### 2.6 LINE CONDUCTED RF VOLTAGE MEASUREMENT

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are Quasi-peak values.

Temperature : 24°C

Humidity : 50% RH

FREQUENCY (MHz)	READING(dB $\mu$ V)				LIMITS (dB $\mu$ V)	
	ONE END & GRD'D		THE OTHER END & GRD'D		Q.P.	Ave.
	Q.P.	Ave.	Q.P.	Ave.		
0.150	*	*	*	*	66.00	56.00
0.164	49.25	*	50.15	*	65.25	55.25
0.252	40.47	*	42.27	*	61.69	51.69
0.813	35.82	*	*	*	56.00	46.00
0.890	*	*	36.73	*	56.00	46.00
2.972	*	*	47.60	38.90	56.00	46.00
3.241	44.49	*	*	*	56.00	46.00
5.112	38.81	*	41.91	*	60.00	50.00
7.852	39.63	*	*	*	60.00	50.00
14.364	*	*	46.26	*	60.00	50.00
17.018	*	*	47.27	*	60.00	50.00
30.000	*	*	*	*	60.00	50.00

REMARKS : 1. \* Undetectable or the Q.P.values is lower than the limits of Ave  
2. For 177220711



### 3. RADIATED EMISSION TEST

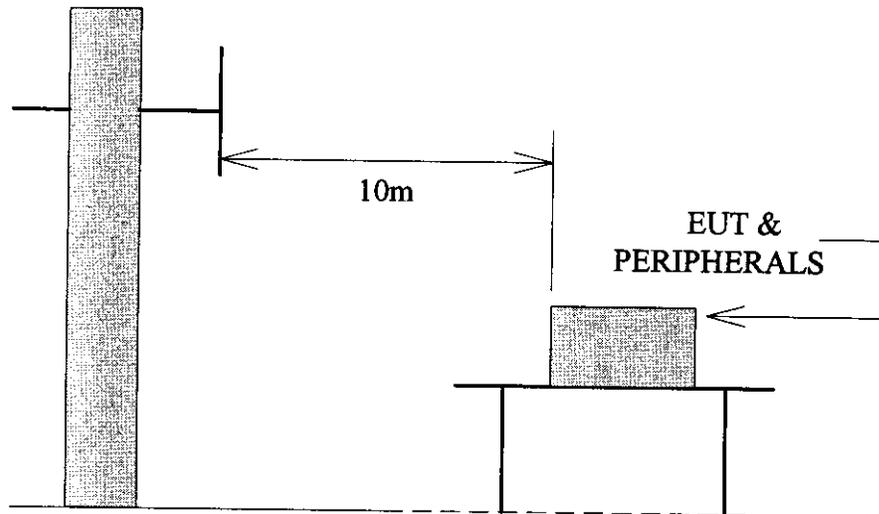
#### 3.1 TEST EQUIPMENTS

The following test equipments are utilized in making the measurements contained in this report.

MANUFACTURER OR TYPE	MODEL NO	SERIAL NO	DATE OF CALIBRATION
CHASE BI-LOG ANTENNA	CBL6111A	1546	MAY.23, 1998
R/S TEST RECEIVER	ESMI	842088/005 841978/008	MAY.29, 1998
OPEN SITE	-----	No.2	AUG. 18, 1998

#### 3.2 TEST SETUP

The diagram below shows the test setup which is utilized to make these measurements.



Antenna Elevation Variable



### 3.3 RADIATION LIMIT

All emanation from a class B computing device or system , including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below :

FREQUENCY (MHz)	DISTANCE (METERS)	FIELD STRENGTHS(dB $\mu$ V/M)	
		CLASS A	CLASS B
30-230	10	40	30
230-1000	10	47	37

Note : (1)The tighter limit shall apply at the edge between two frequency bands.

(2)Distance refers to the distance in meters between the measuring instrument antenna and the closest point of any part of the device or system.

### 3.4 TEST PROCEDURE

The devices under test were placed on a ratable table top 0.8 meter above ground. The table was rotated 360 degrees to determine the position of the highest radiation. EUT is set 10 meters from the interference receiving antenna which is mounted on the top of a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength Both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

The bandwidth setting on the E.M.I. meter (R/S TEST RECEIVER ESMI) is 120 KHz.

The levels are quasi peak value readings. The frequency spectrum from 30MHz to 1000MHz was investigated.

### 3.5 UNCERTAINTY OF RADIATED EMISSION

The uncertainty of radiated emission is  $\pm 2.72$ dB.



### 3.6 RADIATED RF NOISE MEASUREMENT

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are quasi-peak values.

Temperature : 23°C

Humidity : 74% RH

FREQ- UENCY  (MHz)	ANTENNA FACTOR  (dB)	CABLE LOSS  (dB)	METER READING AT10m(dB μ V/M)		LIMITS  (dB μ V/M)	EMISSION LEVEL AT10m(dB μ V/M)	
			HORIZON- TAL	VERTICAL		HORIZON- TAL	VERTICAL
30.00	17.06	1.06	*	*	30.00	*	*
33.22	15.93	1.13	6.26	*	30.00	23.32	*
197.99	9.18	2.62	10.60	12.14	30.00	22.40	23.94
199.97	9.20	2.63	*	8.64	30.00	*	20.47
200.22	9.20	2.63	7.38	1.64	30.00	19.21	13.47
227.69	10.75	2.82	5.56	*	30.00	19.13	*
330.67	14.05	3.49	12.56	10.46	37.00	30.10	28.00
331.65	14.08	3.49	3.74	5.28	37.00	21.31	22.85
899.99	22.13	6.40	2.06	*	37.00	30.59	*
1000.00	23.69	6.80	*	*	37.00	*	*

REMARKS : 1. \* Undetectable

2. Emission level (dB μ V/M) = Antenna Factor (dB) + Cable loss (dB)  
+ Meter Reading (dB μ V/M).

3. For 177220721



### 3.6 RADIATED RF NOISE MEASUREMENT

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are quasi-peak values.

Temperature : 23°C

Humidity : 75% RH

FREQ- UENCY  (MHz)	ANTENNA FACTOR  (dB)	CABLE LOSS  (dB)	METER READING AT10m(dB μ V/M)		LIMITS  (dB μ V/M)	EMISSION LEVEL AT10m(dB μ V/M)	
			HORIZON- TAL	VERTICAL		HORIZON- TAL	VERTICAL
30.00	17.06	1.06	*	*	30.00	*	*
33.22	15.93	1.13	5.70	*	30.00	22.76	*
197.99	9.18	2.62	8.40	10.70	30.00	20.20	22.50
199.97	9.20	2.63	*	10.20	30.00	*	22.03
330.67	14.05	3.49	11.80	12.40	37.00	29.34	29.94
331.65	14.08	3.49	4.95	6.57	37.00	22.52	24.14
899.99	22.13	6.40	1.96	*	37.00	30.49	*
1000.00	23.69	6.80	*	*	37.00	*	*

REMARKS : 1. \*Undetectable

2. Emission level (dB μ V/M) = Antenna Factor (dB) + Cable loss (dB)  
+ Meter Reading (dB μ V/M).

3. For 177220711