



Test Report

For

Applicant : Logitech Far East Ltd.
Equipment Type : Mouse
Model : M-U69
FCC ID : JNZ211444

Report No. : 00AH022F



Test Report Certification

QuieTek Corporation

No.75-1, Wang-Yeh Valley, Yung-Hsing, Chiung-Lin,
Hsin-Chu County, Taiwan, R.O.C.
Tel : 886-3-592-8858, Fax: 886-3-592-8859
E-Mail : quietek@ms24.hinet.net

Accredited by NIST(NVLAP), VCCI, BSMI, DNV, TUV

Applicant : Logitech Far East Ltd.
Address : No.2, Creation Rd.4, Science-Based Ind. Park, Hsinchu, Taiwan,
R.O.C.
Equipment Type : Mouse
Model : M-U69
Measurement Standard : CISPR 22/1994
Measurement Procedure : ANSI C63.4 /1992
FCC ID : JNZ211444
Operation Voltage : DC 5V
Classification : Class B
Test Result : Complied
Test Date : October 2, 2000
Report No. : 00AH022F

NVLAP®

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented by: Rosita Lu

Rosita Lu

Test Engineer: Calien Kang

Calien Kang

Approved: Kevin Wang

Kevin Wang



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REFERENCE

LABORATORY OF LICENSE

1. General Information

1.1 EUT Description

Applicant : Logitech Far East Ltd.

Address : No.2, Creation Rd.4, Science-Based Ind. Park,
Hsinchu, Taiwan, R.O.C.

Equipment Type : Mouse

Model : M-U69

FCC ID : JNZ211444

Remark:

1. The EUT is a PS2 interface Mouse.
2. Two kind of PCB(UJ and UK) were used for the EUT because of the stock during development, and both type were tested individually.
3. QuieTek had verified the construction and function in typical operation, then shown in this test report.



1.2 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

1.2.1 Host Personal Computer

Model Number : D9949A
Serial Number : USO1519668
FCC ID : DoC
Manufacturer : HP
Power Cord : Non-shielded, 1.8m

1.2.2 Monitor

Model Number : CM752ET-311
Serial Number : T8D003312
FCC ID : DoC
Manufacturer : HITACHI
Data Cable : Shielded, 1.6m
Power Cord : Shielded, 1.8m

1.2.3 Keyboard

Model Number : 6311-TW4C
Serial Number : 916590704C91F24437
FCC ID : DoC
Manufacturer : ACER
Data Cable : Shielded, 1.8m

1.2.4 Modem

Model Number : 1414
Serial Number : 980033033
FCC ID : IFAXDM1414
Manufacturer : ACEEX
Data Cable : Shielded, 1.5m
Power Adapter : ACCEX, SCP41-91000A
Cable Output : Shielded, 1.5m

1.2.5 Modem

Model Number : 1414
Serial Number : 980033034
FCC ID : IFAXDM1414
Manufacturer : ACEEX
Data Cable : Shielded, 1.5m
Power Adapter : ACCEX, SCP41-91000A
Cable Output : Shielded, 1.5m

1.2.6 Printer

Model Number : C2642A
Serial Number : MY75J1D1D2
FCC ID : B94C2642X
Manufacturer : HP
Data Cable : Shielded, 1.2m
Power Adapter : NMB, C2175A
Cable for AC IN: Non-shielded, 0.7m
Cable for AC Out: Non-shielded, 1.5m

1.2.7 Mouse(EUT)

Model Number : M-U69
Serial Number : N/A
FCC ID : JNZ211444
Manufacturer : Logitech

1.2.8 Mouse

Model Number : M-S34
Serial Number : LZB75078465
FCC ID : DZL211029
Manufacturer : HP
Data Cable : Shielded, 1.8m

1.2.9 Microphone

Model Number : CD-8000
Serial Number : N/A
FCC ID : DoC
Manufacturer : AIWA
Data Cable : Non-shielded, 1m

1.2.10 Earphone

Model Number : PH136
Serial Number : N/A
Manufacturer : BSD
Data Cable : Shielded, 1.2m

1.2.11 Earphone

Model Number : EPH02
Serial Number : N/A
Manufacturer : PHILIPS
Data Cable : Non-Shielded, 1.2m

1.2.12 Joystick

Model Number : 863132-0000
Serial Number : LCB73202216
FCC ID : DZL211071
Manufacturer : Logitech
Data Cable : Shielded, 2.0m

1.2.13 Video Camera

Model Number : Wcam 3X
Serial Number : N/A
FCC ID : DoC
Manufacturer : Mustek
Data Cable (USB) : Shielded, 1.5m

1.2.14 Speaker

Model Number : J-009
Serial Number : 97-C-019790-T
FCC ID : DoC
Manufacturer : JS
Data Cable : Non-shielded, 1.2m

1.2.15 Speaker

Model Number : J-009
Serial Number : 97-C-019799-T
FCC ID : DoC
Manufacturer : JS
Data Cable : Shielded, 1.2m

1.2.16 Telephone

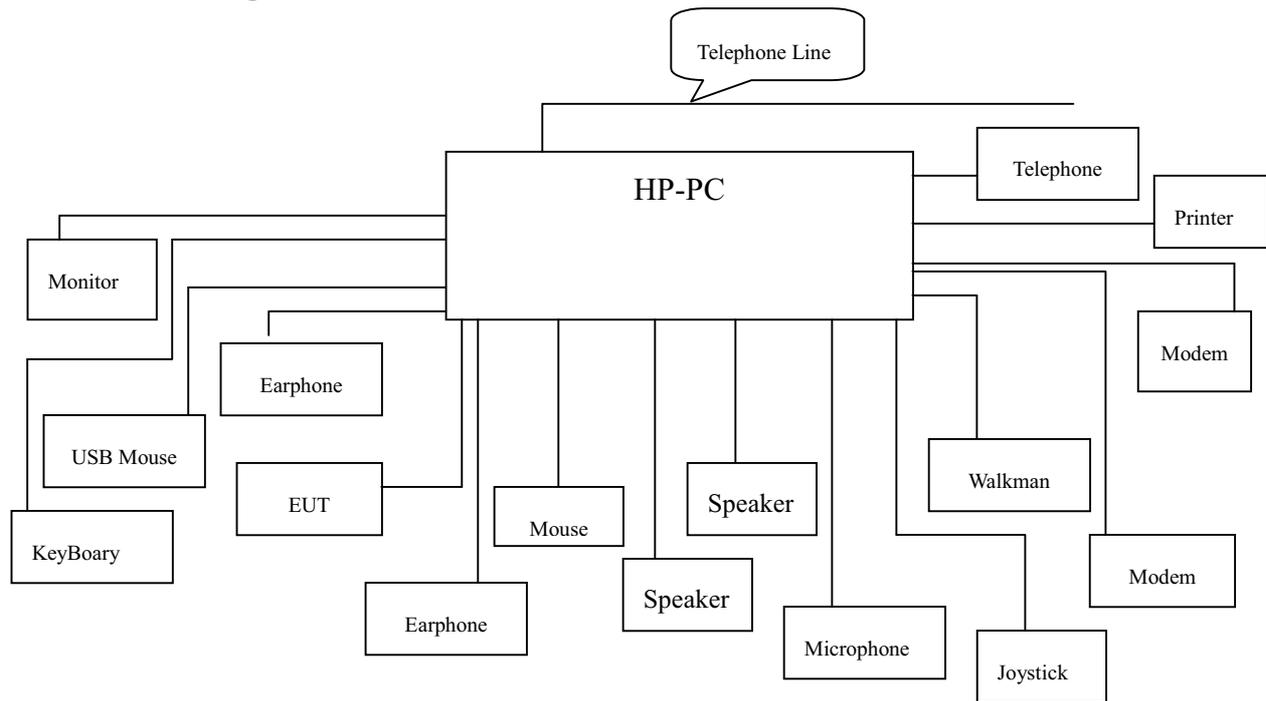
Model Number : VB 9411TEX
Manufacturer : Panasonic
Serial Number : A8EPBT85898
Data Cable : Non-shielded, 1.5m

1.2.17 Walkman

Model Number : TB-21984
Serial Number : N/A
FCC ID : DoC
Manufacturer : TOBISHI
Data Cable : Non-shielded, 1.6m



1.3 EUT Configuration



1.4 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

- 1.4.1 Setup the EUT and simulators as shown on 1.3
- 1.4.2 Turn on the power of all equipment.
- 1.4.3 Boot the PC into the windows 98 from Hard Disk.
- 1.4.4 PC reads test software from Hard Disk.
- 1.4.5 The PC will send “H” character to the monitor and the screen display and fill with “H” pattern.
- 1.4.6 The PC will send “H” character to the printer, the printer will print “H” pattern on paper.
- 1.4.7 The PC will check EUT through PS2 port of PC.
- 1.4.8 The PC will reads data from the floppy disk and then writes data into the floppy disk, same operation for hard disk.
- 1.4.9 Repeat the above procedure 1.4.4 to 1.4.8

1.5 Test performed

Conducted emissions were investigated over the frequency range from **0.15MHz to 30MHz** using a receiver bandwidth of 9kHz.

Radiated emissions were investigated over the frequency range from **30MHz to 1000MHz** using a receiver bandwidth of 120kHz. Radiated testing was performed at an antenna to EUT distance of 10 meters.

1.6 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on

Federal Communications Commission

FCC Engineering Laboratory

7435 Oakland Mills Road

Columbia, MD 21046

Reference 31040/SIT1300F2



September 30, 1998 Accreditation on NVLAP

NVLAP Lab Code: 200347-0

February 23, 1999 Accreditation on DNV

Statement No. : 413-99-LAB11



December 8, 1998 Registration on VCCI

Registration No. for No.2 Shielded Room C-858

Registration No. for No.1 Open Area Test Site R-823

Registration No. for No.2 Open Area Test Site R-835



January 04, 1999 Accreditation on TÜV Rheinland

Certificate No.: I9865712-9901



Name of firm : QuieTek Corporation

Site location : No.75-1, Wang-Yeh Valley, Yung-Hsing Tsuen,
Chiung-Lin, Hsin-Chu County, Taiwan, R.O.C.

2. Conducted Emission

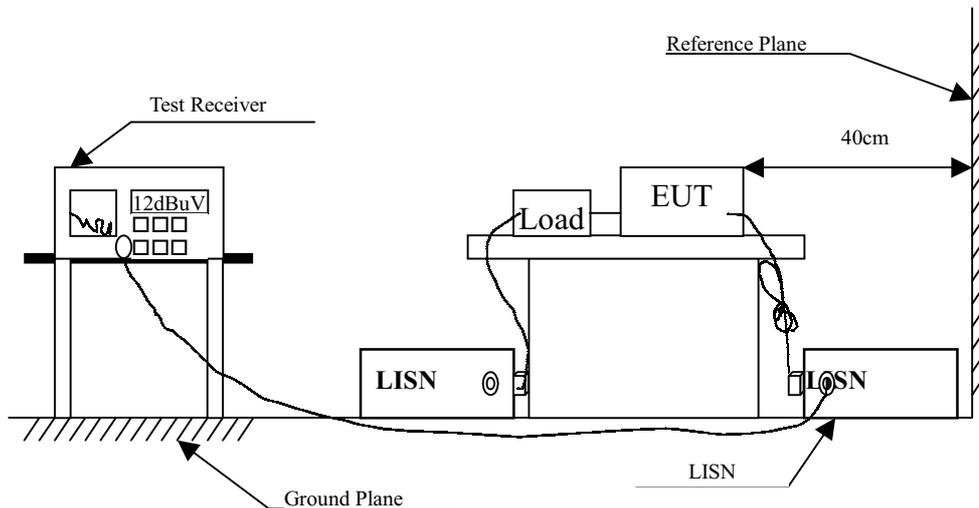
2.1 Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2000	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2000	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2000	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2 Test Setup



2.3 Limits

CISPR 22 Limits (dBuV)					FCC Part 15 Subpart B (dBuV)				
Frequency MHz	Class A		Class B		Frequency MHz	Class A		Class B	
	QP	AV	QP	AV		uV	dBuV	uV	dBuV
0.15 - 0.50	79	66	66-56	56-46	0.45-1.705	1000	60.0	250	48.0
0.50-5.0	73	60	56	46	1.705-30	3000	69.5	250	48.0
5.0 - 30	73	60	60	50					

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

2.4 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 /1992 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

2.5 Test Results

The conducted emission from the EUT is measured and shown in Attachment 1 of test report. The acceptance criterion was met and the EUT passed the test.

3. Radiated Emission

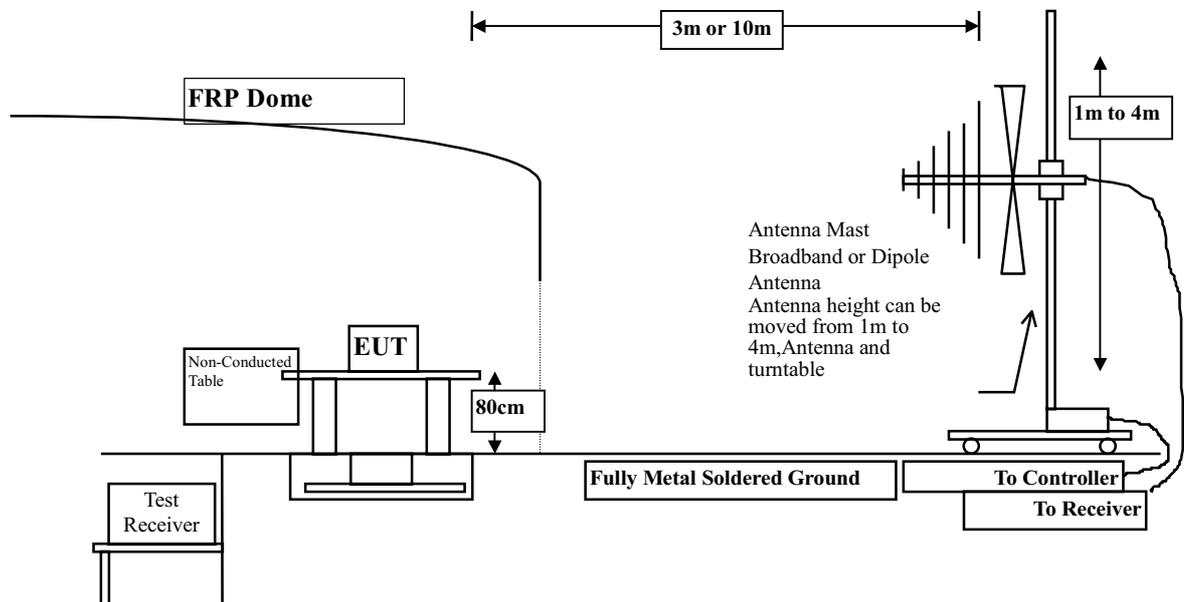
3.1 Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2000
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2000
		Pre-Amplifier	HP	8447D/3307A01812	May, 2000
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2000
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2000
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2000
		Pre-Amplifier	HP	8447D/3307A01814	May, 2000
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2000

- Note:
1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

3.2 Test Setup



3.3 Limits

CISPR 22 Limits					FCC Part 15 Subpart B				
Frequency	Class A		Class B		Frequency	Class A		Class B	
MHz	Distance (m)	dBuV/m	Distance (m)	dBuV/m		uV/m	dBuV/m	uV/m	dBuV/m
30 – 230	10	40	10	30	30 – 88	90	39	100	40.0
230 – 1000	10	47	10	37	88 – 216	150	43.5	150	43.5
					216 – 960	210	46.5	200	46.0
					960 - 2000	300	49.5	500	54.0

Remark: 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 closed point of any part of the device or system.
3. RF Line Voltage (dBuV/m) = 20 log RF Line Voltage (uV/m)

3.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 /1992 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30) is 120 kHz.

3.5 Test Results

The radiated emission from the EUT is measured and shown in attachment 1 of test report. The acceptance criterion was met and the EUT passed the test.

4. **EMI Reduction Method During Compliance Testing**

No modification was made during testing.



5. Attachment

Attachment 1: Summary of Test Results	Number of Pages: 9
Attachment 2: EUT Test Photographs	Number of Pages: 4
Attachment 3: EUT Detailed Photographs	Number of Pages: 10

Attachment 1 : Summary of Test Results

The test results in the emission were performed according to the requirements of measurement standard and process. QuieTek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission and immunity are listed as the attached data.

All the tests were carried out with the EUT in normal operation, which was defined as:

Mode 1: M-U69 (UK)

Mode 2: M-U69 (UJ)

The EUT passed all the tests.

The uncertainty is calculated in accordance with NAMAS NIS 81, The total uncertainty for this test is as follows:

➤ **Emission Test**

- Uncertainty in the Conducted Emission Test: $< \pm 2.0 \text{ dB}$
- Uncertainty in the field strength measured: $< \pm 4.0 \text{ dB}$

CONDUCTED EMISSION DATA

Date of Test : October 11, 2000 EUT : Mouse
 Test Mode : Mode 1 Detect Mode : Quasi-Peak

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level Line1 dBuV	Measurement Level Line1 dBuV	Limits dBuV
0.201	0.02	0.10	34.81	34.93	63.57
*0.302	0.04	0.10	33.07	33.21	60.18
0.603	0.07	0.10	23.11	23.28	56.00
1.107	0.11	0.10	26.43	26.64	56.00
4.762	0.20	0.17	25.73	26.09	56.00
11.062	0.29	0.24	26.99	27.52	60.00

Average:

0.201	0.02	0.10	33.70	33.82	53.57
0.302	0.04	0.10	31.10	31.24	50.18
0.603	0.07	0.10	23.00	23.17	46.00
1.107	0.11	0.10	26.30	26.51	46.00
4.762	0.20	0.17	25.40	25.76	46.00
11.062	0.29	0.24	22.00	22.53	50.00

Remarks :

1. “ * ” means that this data is the worst emission level.



CONDUCTED EMISSION DATA

Date of Test : October 11, 2000 EUT : Mouse
 Test Mode : Mode 1 Detect Mode : Quasi-Peak

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line2	Line2	dBuV
	dB	dB	dBuV	dBuV	

* 0.202	0.02	0.10	42.93	43.05	63.53
0.303	0.04	0.10	38.15	38.29	60.16
0.605	0.07	0.10	25.45	25.62	56.00
1.006	0.10	0.10	25.07	25.27	56.00
5.539	0.21	0.17	27.73	28.12	60.00
11.060	0.29	0.24	26.85	27.38	60.00

Average:

0.202	0.02	0.10	42.50	42.62	53.53
0.303	0.04	0.10	36.00	36.14	50.16
0.605	0.07	0.10	25.40	25.57	46.00
1.006	0.10	0.10	25.00	25.20	46.00
5.539	0.21	0.17	24.00	24.39	50.00
11.060	0.29	0.24	21.90	22.43	50.00

Remarks :

1. “ * ” means that this data is the worst emission level.



CONDUCTED EMISSION DATA

Date of Test : October 11, 2000 EUT : Mouse
 Test Mode : Mode 2 Detect Mode : Quasi-Peak

Frequency	Cable Loss	LISN Factor	Reading Level	Measurement Level	Limits
MHz	dB	dB	Line1 dBuV	Line1 dBuV	dBuV
0.201	0.02	0.10	32.57	32.69	63.58
0.305	0.04	0.10	26.84	26.98	60.11
0.607	0.07	0.10	22.14	22.31	56.00
1.005	0.10	0.10	22.88	23.08	56.00
1.262	0.11	0.11	20.79	21.01	56.00
*4.872	0.20	0.17	26.13	26.50	56.00

Average:

0.201	0.02	0.10	20.14	20.26	53.57
0.305	0.04	0.10	19.61	19.75	50.11
0.607	0.07	0.10	11.35	11.52	46.00
1.005	0.10	0.10	12.54	12.74	46.00
1.262	0.11	0.11	11.94	12.16	46.00
4.872	0.20	0.17	21.98	22.35	46.00

Remarks :

1. “ * ” means that this data is the worst emission level.



CONDUCTED EMISSION DATA

Date of Test : October 11, 2000 EUT : Mouse
 Test Mode : Mode 2 Detect Mode : Quasi-Peak

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line2	Line2	dBuV
	dB	dB	dBuV	dBuV	

*0.201	0.02	0.10	36.54	36.66	63.57
0.314	0.04	0.10	32.10	32.24	59.86
0.627	0.08	0.10	21.76	21.94	56.00
1.057	0.10	0.10	22.34	22.55	56.00
4.897	0.20	0.17	24.50	24.87	56.00
11.220	0.29	0.24	26.89	27.42	60.00

Average:

0.201	0.02	0.10	33.84	33.96	53.57
0.314	0.04	0.10	28.14	28.28	49.86
0.627	0.08	0.10	17.32	17.50	46.00
1.057	0.10	0.10	17.74	17.95	46.00
4.897	0.20	0.17	20.03	20.40	46.00
11.220	0.29	0.24	22.84	23.37	50.00

Remarks :

1. “ * ” means that this data is the worst emission level.



RADIATED EMISSION DATA

Date of Test : October 11, 2000 EUT : Mouse
 Test Mode : Mode 1 Test Site : No.1 Open Test Site

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit	Ant	Turn
MHz	Loss Factor	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm deg

47.998	1.33	8.92	0.00	5.62	15.87	14.13	30.00	400	204
54.000	1.38	6.64	0.00	7.07	15.09	14.91	30.00	400	25
60.000	1.44	5.49	0.00	3.22	10.15	19.85	30.00	400	204
71.590	1.55	6.94	0.00	2.07	10.57	19.43	30.00	400	169
114.290	1.96	11.70	0.00	4.16	17.82	12.18	30.00	400	204
123.940	2.06	11.84	0.00	6.15	20.05	9.95	30.00	400	156
*140.842	2.21	11.28	0.00	6.69	20.19	9.81	30.00	400	159

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

RADIATED EMISSION DATA

Date of Test : October 11, 2000 EUT : Mouse
 Test Mode : Mode 1 Test Site : No.1 Open Test Site

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit	Ant	Turn
MHz	Loss Factor	dB/m	dB	Level	Vertical	dBuV	dBuV/m	dB	dBuV/m
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg

*48.000	1.33	8.03	0.00	13.93	23.29	6.71	30.00	100	38
60.000	1.44	6.00	0.00	8.16	15.60	14.40	30.00	100	69
73.240	1.57	6.63	0.00	10.33	18.53	11.47	30.00	100	192
114.305	1.96	11.35	0.00	7.14	20.45	9.55	30.00	100	172
120.000	2.02	11.56	0.00	3.28	16.86	13.14	30.00	100	122
147.886	2.29	10.38	0.00	1.82	14.49	15.51	30.00	100	156
246.570	3.24	12.01	0.00	6.25	21.51	15.49	37.00	100	175

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss



RADIATED EMISSION DATA

Date of Test : October 11, 2000 EUT : Mouse
 Test Mode : Mode 2 Test Site : No.1 Open Test Site

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit	Ant	Turn
MHz	Loss	Factor	dB/m	dB	Level	Horizontal	dB	dBuV/m	dB dBuV/m cm deg

58.360	1.42	5.52	0.00	5.03	11.97	18.03	30.00	401	120
62.570	1.47	5.35	0.00	8.86	15.67	14.33	30.00	401	146
66.740	1.50	6.16	0.00	9.81	17.48	12.52	30.00	401	152
*70.900	1.54	6.62	0.00	14.43	22.59	7.41	30.00	401	122
134.000	2.15	11.49	0.00	0.60	14.24	15.76	30.00	401	122
177.600	2.57	9.83	0.00	4.81	17.21	12.79	30.00	401	97
204.700	2.83	9.38	0.00	6.88	19.09	10.91	30.00	401	142
210.710	2.89	9.49	0.00	6.39	18.77	11.23	30.00	401	125
260.500	3.36	13.95	0.00	0.21	17.53	19.47	37.00	401	147
301.030	3.76	13.36	0.00	1.91	19.03	17.97	37.00	329	13

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss



RADIATED EMISSION DATA

Date of Test : October 11, 2000 EUT : Mouse
 Test Mode : Mode 2 Test Site : No.1 Open Test Site

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit	Ant	Turn
MHz	Loss Factor	dB/m	dB	Level	Vertical	dBuV	dBuV/m	dB	dBuV/m
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg

*41.835	1.26	11.88	0.00	6.59	19.73	10.27	30.00	100	202
54.000	1.38	6.90	0.00	4.15	12.43	17.57	30.00	100	202
60.005	1.44	6.00	0.00	8.73	16.17	13.83	30.00	100	183
66.335	1.50	5.83	0.00	8.12	15.45	14.55	30.00	100	202
72.195	1.55	6.10	0.00	3.72	11.37	18.63	30.00	100	11
83.985	1.67	8.26	0.00	2.00	11.93	18.07	30.00	100	144
114.385	1.96	11.35	0.00	6.40	19.71	10.29	30.00	100	179

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss