



Test Report

For

Applicant : Logitech Far East Ltd.
Equipment Type : Mouse
Model : M-S69
FCC ID : JNZ211443

Report No. : 009H057F



Test Report Certification

Quietek Corporation

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

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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-S69
Measurement Standard : CISPR 22/1994
Measurement Procedure : ANSI C63.4 /1992
FCC ID : JNZ211443
Operation Voltage : DC 5V
Classification : Class B
Test Result : Complied
Test Date : October 2, 2000
Report No. : 009H057F

NVLAP®

The Test Results relate only to the samples tested.

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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: Kuofeng Fang

Kuofeng Fang

Approved: Kevin Wang

Kevin Wang



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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-S69

FCC ID : JNZ211443

Remark:

1. The EUT is a PS2 interface Mouse.
2. Two kind of cable (shielded and non-shielded) 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 : D9944A
Serial Number : USO1519668
FCC ID : DoC
Manufacturer : HP
Power Cord : Non-shielded, 1.8m

1.2.2 Monitor

Model Number : CM752ET-311
Serial Number : T8F006364
FCC ID : DoC
Manufacturer : HITACHI
Data Cable : Shielded, 1.5m
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 : 980033035
FCC ID : IFAXDM1414
Manufacturer : ACEEX
Data Cable : Shielded, 1.5m
Power Adapter : ACCEX, SCP41-91000A
Cable Output : Shielded, 1.5m



1.2.5 Printer

Model Number : C2642A
Serial Number : MY75N1D2BC
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

1.2.6 Mouse (EUT)

Model Number : M-S69
Serial Number : N/A
FCC ID : JNZ211443
Manufacturer : Logitech

1.2.7 Mouse

Model Number : M-UB48
Serial Number : LTC74800118
FCC ID : DZL211137
Manufacturer : Logitech
Data Cable : Shielded, 1.8m

1.2.8 Mouse

Model Number : MUS2U
Serial Number : N/A
FCC ID : DoC
Manufacturer : TREMON
Data Cable : Shielded, 1.8m

1.2.9 Wire Microphone

Model Number : WH-002
Serial Number : BM00330500
FCC ID : DoC
Manufacturer : W&H
Audio Cable : Shielded, 5.5m

1.2.10 Microphone

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

1.2.11 Microphone

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

1.2.12 Joystick

Model Number : JPD110
Serial Number : 9814A15646
FCC ID : DoC
Manufacturer : Maxxtro
Data Cable : Shielded, 1.7m

1.2.13 Walkman

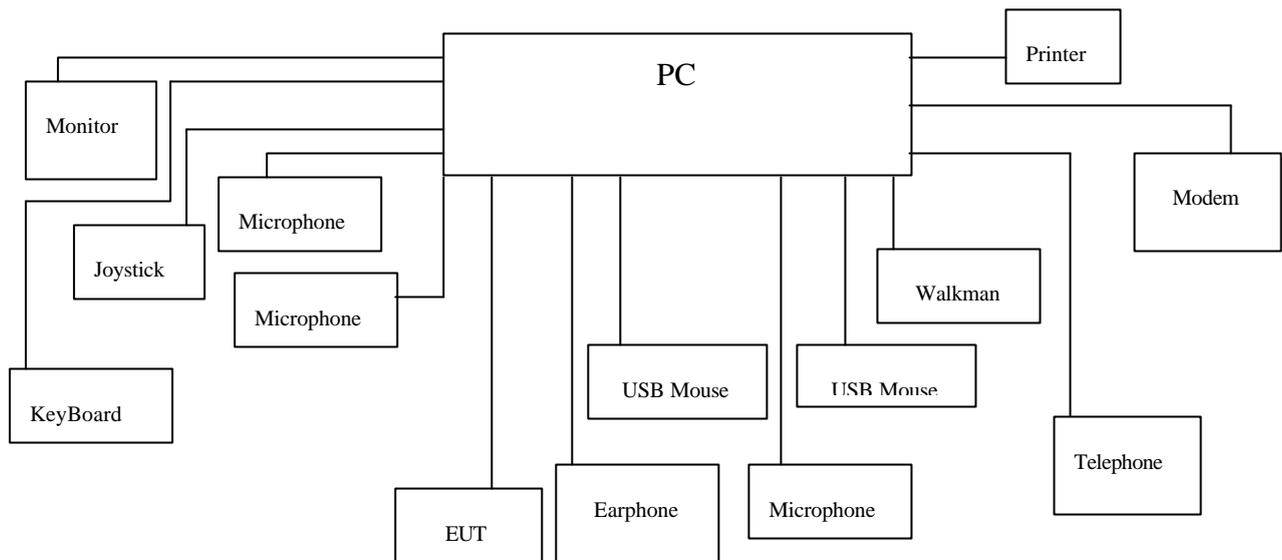
Model Number : TB-21984
Serial Number : N/A
FCC ID : DoC
Manufacturer : TOBISHI
Data Cable : Non-shielded, 1.6m

1.2.14 Telephone

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



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 invested over the frequency range from **0.15MHz to 30MHz** using a receiver bandwidth of 9kHz.

Radiated emissions were invested 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 (mb ar)	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

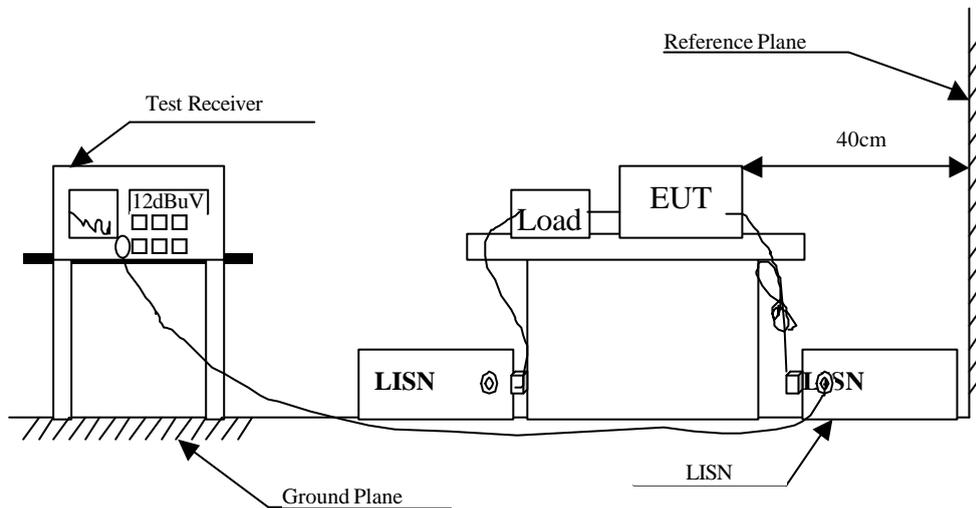
2.1 Test Equipment List

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

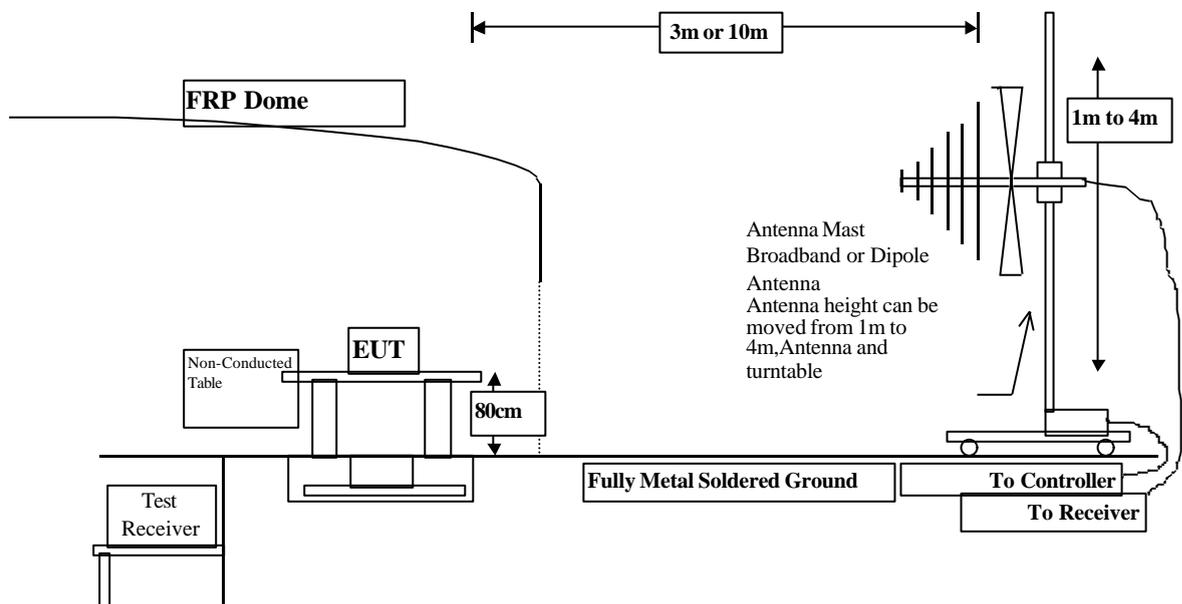
3.1 Test Equipment

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: 6

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: Shielded Cable

Mode 2: Non-Shielded Cable

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 2, 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
*0.232	0.02	0.00	43.23	43.25	62.38
0.349	0.04	0.00	34.53	34.57	58.98
0.923	0.10	0.00	31.39	31.49	56.00
4.607	0.19	0.00	34.85	35.04	56.00
9.330	0.27	0.00	32.21	32.48	60.00
19.220	0.35	0.00	17.93	18.28	60.00

Average:

0.232	0.02	0.10	42.40	42.52	52.38
0.349	0.04	0.10	33.70	33.84	48.99
0.923	0.10	0.10	29.80	30.00	46.00
4.607	0.19	0.17	34.80	35.16	46.00
9.329	0.27	0.20	27.30	27.77	50.00
19.220	0.35	0.44	11.70	12.49	50.00

Remarks :

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

CONDUCTED EMISSION DATA

Date of Test : October 2, 2000 EUT : Mouse
 Test Mode : Mode 1 Detect Mode : Quasi-Peak

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level Line2 dBuV	Measurement Level Line2 dBuV	Limits dBuV
*0.232	0.02	0.00	49.65	49.67	62.38
0.345	0.04	0.00	43.29	43.33	59.07
0.927	0.10	0.00	35.07	35.17	56.00
4.607	0.19	0.00	17.49	17.68	56.00
9.205	0.27	0.00	26.67	26.94	60.00
17.844	0.34	0.00	35.65	35.99	60.00
Average:					
0.232	0.02	0.10	48.80	48.92	52.38
0.345	0.04	0.10	43.10	43.24	49.08
0.927	0.10	0.10	33.40	33.60	46.00
4.607	0.19	0.17	14.20	14.56	46.00
9.204	0.27	0.20	21.40	21.86	50.00
17.844	0.34	0.41	31.10	31.85	50.00

Remarks :

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

CONDUCTED EMISSION DATA

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

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level Line1 dBuV	Measurement Level Line1 dBuV	Limits dBuV
*0.236	0.02	0.10	40.75	40.87	62.24
0.302	0.04	0.10	33.67	33.81	60.18
0.353	0.05	0.10	35.29	35.44	58.89
0.502	0.06	0.10	23.45	23.61	56.00
0.705	0.08	0.10	29.43	29.61	56.00
3.123	0.17	0.15	13.83	14.15	56.00

Average:

0.236	0.02	0.10	37.90	38.02	52.24
0.302	0.04	0.10	32.40	32.54	50.19
0.353	0.05	0.10	34.80	34.95	48.89
0.501	0.06	0.10	23.20	23.36	46.00
0.704	0.08	0.10	25.90	26.08	46.00
3.122	0.17	0.15	10.50	10.82	46.00

Remarks :

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

CONDUCTED EMISSION DATA

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

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level Line2 dBuV	Measurement Level Line2 dBuV	Limits dBuV
0.205	0.02	0.10	41.07	41.19	63.42
*0.236	0.02	0.10	40.05	40.17	62.24
0.302	0.04	0.10	33.43	33.57	60.18
0.349	0.04	0.10	34.87	35.01	58.98
14.135	0.32	0.33	17.43	18.07	60.00
19.421	0.35	0.44	18.61	19.40	60.00
Average:					
0.205	0.02	0.10	35.60	35.72	53.41
0.236	0.02	0.10	37.20	37.32	52.24
0.302	0.04	0.10	32.30	32.44	50.19
0.349	0.04	0.10	34.50	34.64	48.99
14.124	0.32	0.33	14.50	15.14	50.00
19.421	0.35	0.44	13.00	13.79	50.00

Remarks :

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

RADIATED EMISSION DATA

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

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
71.350	1.80	6.94	0.00	0.32	9.06	20.94	30.00	397	144
*110.140	2.18	11.97	0.00	-0.34	13.82	16.18	30.00	397	169
145.320	2.52	11.26	0.00	-1.54	12.24	17.76	30.00	397	38
186.290	2.91	8.98	0.00	-1.92	9.97	20.03	30.00	397	148
215.640	3.22	9.01	0.00	-1.68	10.55	19.45	30.00	397	83
240.640	3.45	11.47	0.00	-2.12	12.80	24.20	37.00	397	16

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 2, 2000 EUT : Mouse
 Test Mode : Mode 1 Test Site : No.1 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
70.020	1.78	5.38	0.00	1.92	9.08	20.92	30.00	99	86
*111.570	2.20	11.72	0.00	-0.38	13.54	16.46	30.00	99	10
185.210	2.91	9.01	0.00	-1.72	10.20	19.80	30.00	99	29
196.710	3.04	8.94	0.00	-1.90	10.08	19.92	30.00	99	80
215.640	3.22	9.03	0.00	-1.68	10.57	19.43	30.00	99	147
266.023	3.60	13.94	0.00	-2.12	15.42	21.58	37.00	99	104

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 2, 2000 EUT : Mouse
 Test Mode : Mode 2 Test Site : No.1 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
75.240	1.86	7.42	0.00	0.22	9.50	20.50	30.00	397	167
*110.290	2.18	11.97	0.00	-0.06	14.10	15.90	30.00	397	174
144.957	2.51	11.26	0.00	-1.86	11.91	18.09	30.00	397	101
163.790	2.67	9.55	0.00	-1.44	10.78	19.22	30.00	397	171
220.790	3.30	9.53	0.00	0.08	12.92	17.08	30.00	397	131
245.790	3.46	12.21	0.00	-2.04	13.64	23.36	37.00	397	117

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 2, 2000 EUT : Mouse
 Test Mode : Mode 2 Test Site : No.1 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
*40.440	1.38	12.98	0.00	4.06	18.41	11.59	30.00	99	190
58.750	1.62	6.30	0.00	0.42	8.34	21.66	30.00	99	8
61.070	1.65	6.15	0.00	-1.38	6.42	23.58	30.00	99	109
130.640	2.36	11.79	0.00	-1.30	12.86	17.14	30.00	99	187
147.360	2.52	10.68	0.00	-1.76	11.44	18.56	30.00	99	114
182.570	2.90	8.96	0.00	-1.86	10.00	20.00	30.00	99	39
216.710	3.25	9.16	0.00	-2.06	10.35	19.65	30.00	99	102

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