FCC DoC TEST REPORT

REPORT NO. : D920122H02

MODEL NO. : M-SBF69

RECEIVED : Jan. 22, 2003

TESTED : Jan. 22, 2003

APPLICANT : LOGITECH FAR EAST LTD.

ADDRESS : #2 Creation Rd. 4, Science-Based Ind. Park Hsinchu Taiwan, R.O.C.

ISSUED BY : Advance Data Technology Corporation

LAB LOCATION : No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien, Taiwan, R.O.C.

0536
ILAC MRA

Lab Code: 200376-0

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1 CERTIFICATION

PRODUCT : Mouse
BRAND NAME : Logitech
MODEL NO : M-SBF69
TEST ITEM : ENGINEERING SAMPLE
APPLICANT : LOGITECH FAR EAST LTD.
STANDARDS : FCC Part 15, Subpart B, Class B
CISPR 22: 1997, Class B
ANSI C63.4-1992
ICES-003: 1997

We, **Advance Data Technology Corporation**, hereby certify that one sample (Model: M-SBF69) of the designation has been tested in our facility on Jan. 22, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

CHECKED BY: Midoli Peng , **DATE:** *Feb. 06, 2003*
(Midoli Peng)

APPROVED BY: , **DATE:** *Feb. 06, 2003*
(Eric Lin, Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Remarks
FCC Part 15, Subpart B / CISPR 22: 1997, Class B	Conducted Test	**PASS**	Meets Class B Limit Minimum passing margin is -23.96 dB at 24.004 MHz
	Radiated Test	**PASS**	Meets Class B Limit Minimum passing margin is -8.7 dB at 117.52 MHz

NOTE: For conducted emission test, the test limit used is according to FCC Part 15.107. In this part, conducted emission test for telecom port is not mentioned and therefore this item is not tested.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mouse
MODEL NO.	M-SBF69
POWER SUPPLY	DC 5V (From PC)
DATA CABLE	PS2 Cable (Unshielded, 1.8m)

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODE

The EUT was tested under following test modes:

- EUT with PS2 Cable (1.8m) / PS2 Interface

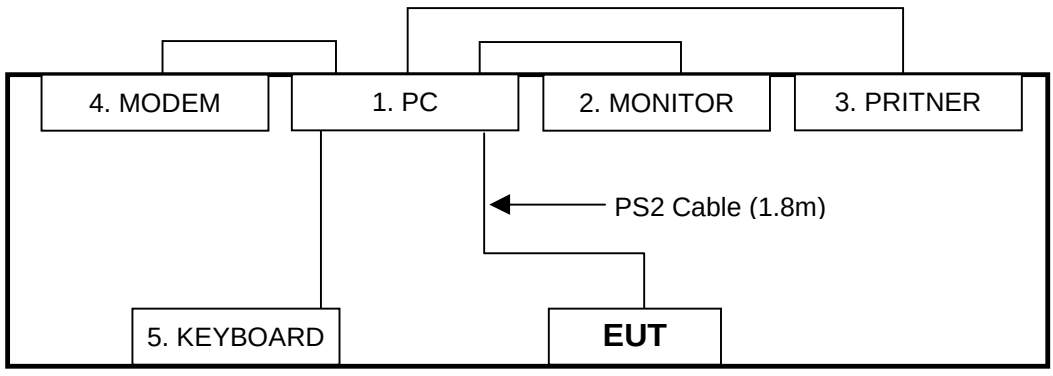
3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	PERSONAL COMPUTER	HEWLETT PAC	HP Vectra XE310	SG14902704	DoC
2	MONITOR	ADI	937G	81801CT00119727	BR8937G
3	PRINTER	HP	C2642A	MY79F1C3MZ	B94C2642X
4	MODEM	ACEEX	1414	0206026779	IFAXDM1414
5	KEYBOARD	HP	6511-PK	99P468101CY1W01	DoC

No.	Signal cable description
1	NA
2	1.6 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.
3	1.8m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
4	1.0 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	1.9 m foil shielded wire, terminal by frame, PS2 Connector, w/o Core.

Note: The power cords of the above support units 1-4 were unshielded (1.8m).



NOTE: 1. Please refer to the photos of test configuration in Item 5 also.

4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTES: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	847124/029	Nov. 17, 2003
ROHDE & SCHWARZ LISN (for EUT)	ESHS-Z5	848773/004	Nov. 13, 2003
KYORITSU LISN (for peripheral)	KNW-407	8/1395/12	Jul. 23, 2003
RF Cable (JETBAO)	RG233/U	Cable_CA_01	Jul. 03, 2003
Terminator(for KYORITSU)	50	#1	Apr. 11, 2003
Software	Cond-V2e	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in ADT Shielded Room No. A.
3. The VCCI Con A Registration No. is C-817.

4.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

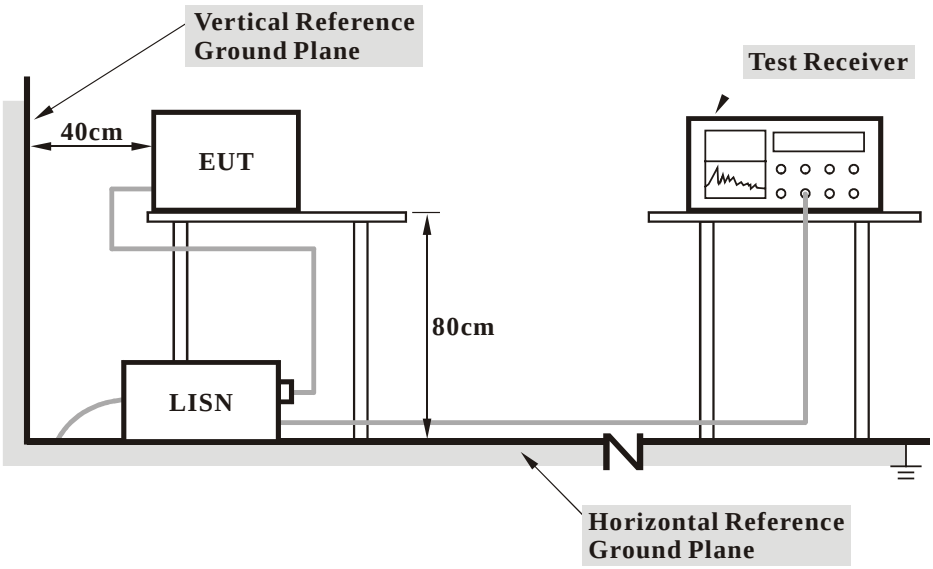
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 20dB under the prescribed limits could not be reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related Item - Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

a. Turn on the power of all equipment.

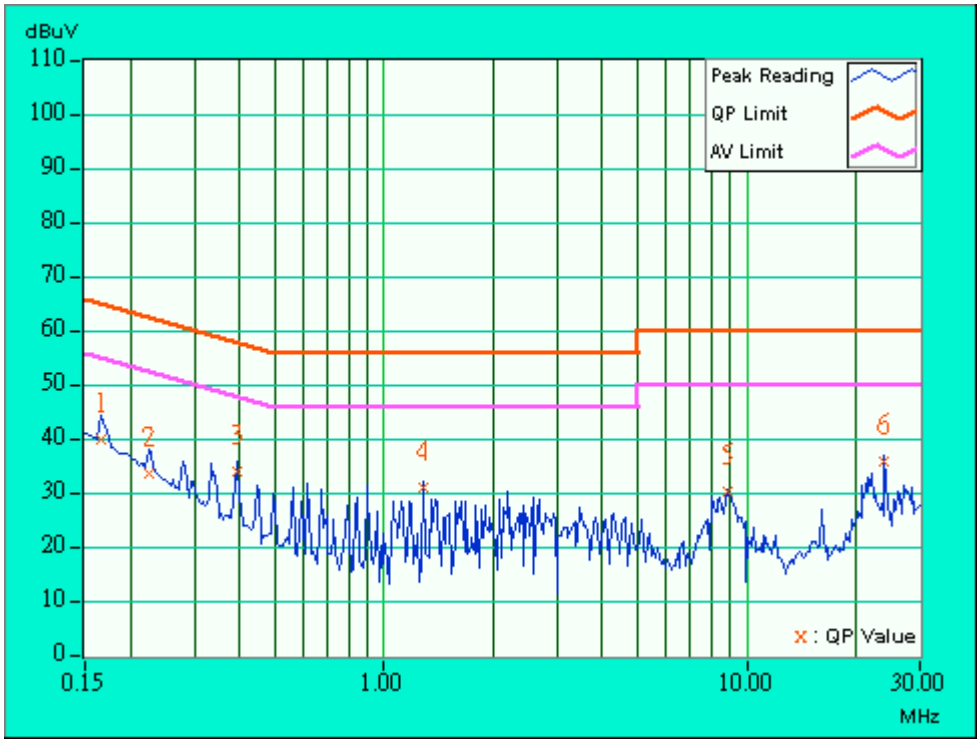
b. Run a test program to enable all function of the continuously.

4.1.7 TEST RESULTS

EUT	Mouse	**MODEL**	M-SBF69
INPUT POWER	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 60 % RH, 981 hPa	**6dB BANDWIDTH**	9 kHz
TESTED BY:	Panny Tseng		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.10	39.02	-	39.12	-	65.18	55.18	-26.06	-
2	0.224	0.10	32.59	-	32.69	-	62.66	52.66	-29.97	-
3	0.392	0.10	32.88	-	32.98	-	58.02	48.02	-25.04	-
4	1.291	0.10	29.91	-	30.01	-	56.00	46.00	-25.99	-
5	8.857	0.56	29.14	-	29.70	-	60.00	50.00	-30.30	-
6	**24.004**	**1.16**	**34.88**	**-**	**36.04**	**-**	**60.00**	**50.00**	**-23.96**	**-**

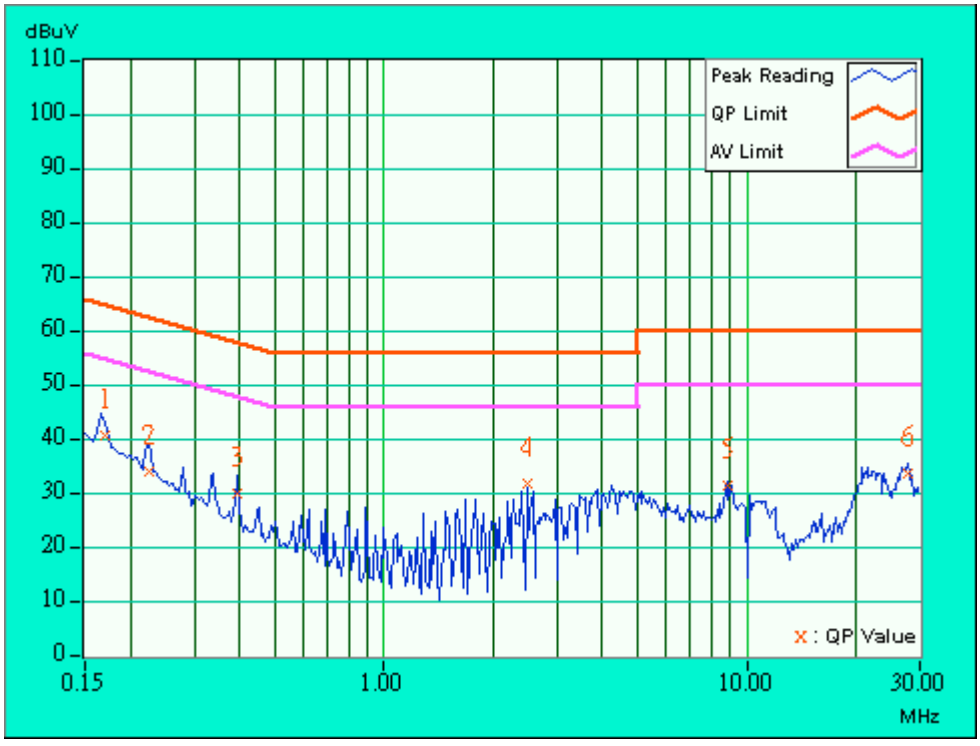
NOTES: (1) "*": Undetectable
(2) Q.P. and AV. are abbreviations of quasi-peak and average.
(3) "-": The Quasi-peak reading value also meets an average limit, thus measurement with the average detector is unnecessary.
(4) The emission levels of other frequencies were very low against the limit.
(5) Correction Factor = Insertion loss + Cable loss
(6) Margin value = Emission level - Limit value



EUT	Mouse	**MODEL**	M-SBF69
INPUT POWER	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMEBNTAL CONDITIONS	23 deg. C, 60 % RH, 981 hPa	**6dB BANDWIDTH**	9 kHz
TESTED BY:	Panny Tseng		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.169	0.10	39.67	-	39.77	-	64.99	54.99	-25.22	-
2	0.224	0.10	33.20	-	33.30	-	62.66	52.66	-29.36	-
3	0.392	0.10	29.07	-	29.17	-	58.02	48.02	-28.85	-
4	2.478	0.12	30.99	-	31.11	-	56.00	46.00	-24.89	-
5	8.855	0.48	30.51	-	30.99	-	60.00	50.00	-29.01	-
6	27.770	0.90	32.80	-	33.70	-	60.00	50.00	-26.30	-

NOTES: (1) "*": Undetectable
(2) Q.P. and AV. are abbreviations of quasi-peak and average.
(3) "-": The Quasi-peak reading value also meets an average limit, thus measurement with the average detector is unnecessary.
(4) The emission levels of other frequencies were very low against the limit.
(5) Correction Factor = Insertion loss + Cable loss
(6) Margin value = Emission level - Limit value



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

Note: (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HP Spectrum Analyzer	8590L	3829A02338	Sep. 10, 2003
*ADVANTEST Spectrum Analyzer	R3271A	85060311	May 21, 2003
CHASE RF Pre_Amplifier	CPA9232	1001	Mar. 02, 2003
*HP Pre_Amplifier	8449B	3008A01281	Jun. 12, 2003
*ROHDE & SCHWARZ Test Receiver	ESCS 30	100027	May 23, 2003
*CHASE Broadband Antenna	CBL6112B	2502	Jun. 28, 2003
*Schwarzbeck Horn_Antenna	BBHA9120-D1	D123	Jul. 31, 2003
SCHWARZBECK Tunable Dipole Antenna	UHAP	896	Mar. 07, 2003
SCHWARZBECK Tunable Dipole Antenna	VHAP	879	Mar. 07, 2003
*RF Switches	MP59B	M50867	Jul. 26, 2003
*RF Cable(JETBAO)	BELDN RG-214	Cable_OA_01	Jul. 26, 2003
*Software	AS60P8	NA	NA
*EMCO Antenna Tower	2075-2	9712-2124	NA
*EMCO Turn Table	2081-1.53	9712-2030	NA
*CORCOM AC Filter	MRI2030	107/108	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. * = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. A.
5. The VCCI Site Registration No. is R-782.
6. The FCC Site Registration No. is 91097.

4.2.3 TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10-meter open field site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization's of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

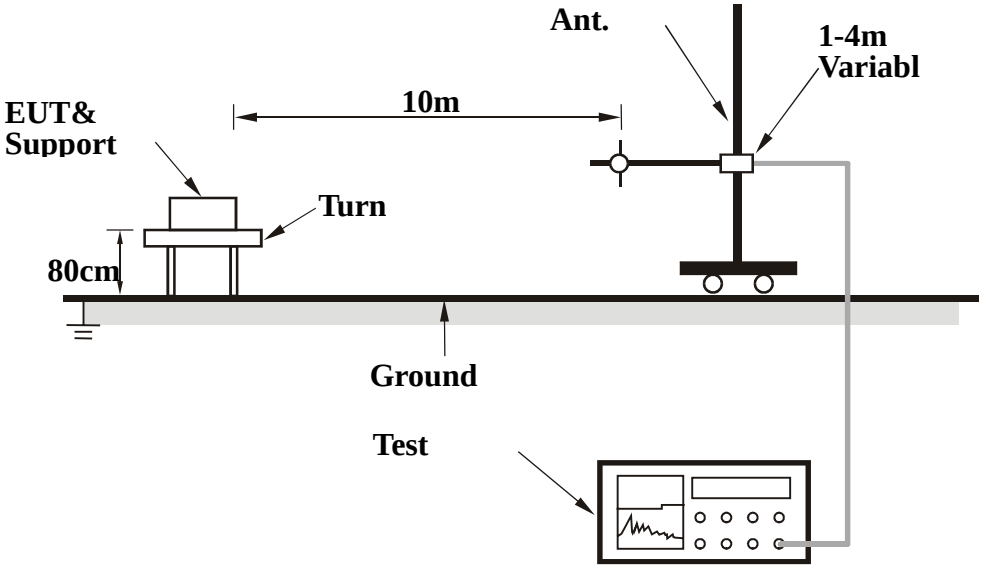
f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi- peak method or average method as specified and then reported In Data sheet peak mode and QP mode.

g. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the interference antenna and the detect function was set to Peak or Average.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related Item - Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

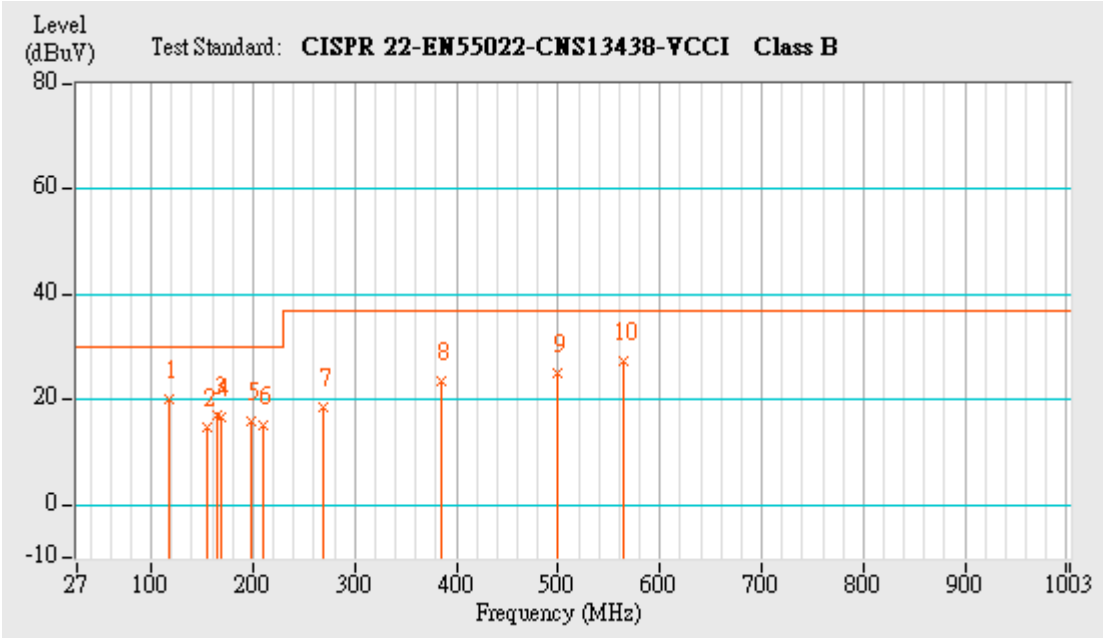
4.2.7 TEST RESULTS

EUT	Mouse	**MODEL**	M-SBF69
FREQUENCY RANGE	30-1000 MHz	**DETECTOR FUNCTION**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 73 % RH, 981 hPa	**TESTED BY**:	Panny Tseng

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	117.30	20.0 QP	30.00	-10.00	4.00 H	319	6.90	13.10
2	154.30	14.7 QP	30.00	-15.30	4.00 H	236	3.70	10.90
3	164.30	17.0 QP	30.00	-13.00	4.00 H	103	5.60	11.40
4	168.00	16.6 QP	30.00	-13.40	4.00 H	15	5.10	11.50
5	197.50	15.9 QP	30.00	-14.10	4.00 H	74	5.20	10.70
6	209.80	15.0 QP	30.00	-15.00	3.77 H	316	5.10	9.90
7	268.50	18.6 QP	37.00	-18.40	3.67 H	343	4.10	14.50
8	385.83	23.4 QP	37.00	-13.60	3.47 H	54	5.40	18.00
9	499.55	25.2 QP	37.00	-11.80	2.13 H	62	5.00	20.20
10	563.30	27.5 QP	37.00	-9.50	2.21 H	314	5.90	21.60

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

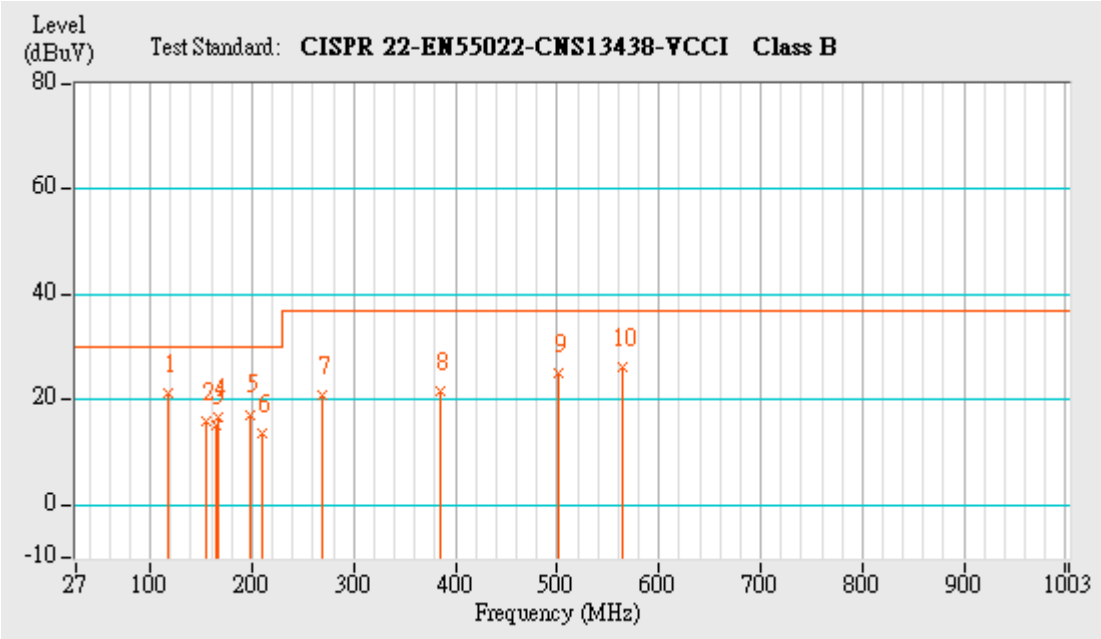


EUT	Mouse	**MODEL**	M-SBF69
FREQUENCY RANGE	30-1000 MHz	**DETECTOR FUNCTION**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 73 % RH, 981 hPa	**TESTED BY**:	Panny Tseng

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**117.52**	**21.3 QP**	**30.00**	**-8.70**	**1.00 V**	**209**	**8.10**	**13.20**
2	154.75	15.8 QP	30.00	-14.20	1.00 V	116	4.80	11.00
3	165.71	15.2 QP	30.00	-14.80	1.00 V	140	3.70	11.50
4	167.32	16.7 QP	30.00	-13.30	1.00 V	186	5.30	11.50
5	197.76	17.2 QP	30.00	-12.80	1.00 V	192	6.50	10.70
6	209.76	13.8 QP	30.00	-16.20	1.00 V	19	3.80	9.90
7	268.80	21.0 QP	37.00	-16.00	1.00 V	359	6.50	14.50
8	385.00	21.6 QP	37.00	-15.40	1.46 V	295	3.60	17.90
9	500.30	24.9 QP	37.00	-12.10	2.27 V	232	4.70	20.20
10	563.60	26.3 QP	37.00	-10.70	2.27 V	269	4.70	21.60

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

ADT CORP.

RADIATED EMISSION TEST

6 APPENDIX A - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
Canada	INDUSTRY CANADA
R.O.C.	CNLA, BSMI

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26052943

Hsin Chu EMC Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Lin Kou Safety Lab:
Tel: 886-2-26093195
Fax: 886-2-26093184

Lin Kou RF & Telecom Lab.
Tel: 886-3-3270910
Fax: 886-3-3270892

Email: service@mail.adt.com.tw
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

7 APPENDIX B - CONSTRUCTION PHOTOS OF EUT


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