

FCC CFR47 PART 15 DIGITAL DEVICE



TEST REPORT

FOR

C-Media CMI8738 PCI Sound Card

MODEL: A521-W0

FCC ID: LWHA521-W0

REPORT NUMBER: 02E0005

ISSUE DATE: March 15, 2002

Prepared for
LABWAY CORPORATION
7F, NO. 150, JIAN YI ROAD, CHUNG HO CITY,
TAIPEI HSIEN, TAIWAN, R. O. C.

Prepared by
COMPLIANCE ENGINEERING SERVICES, INC.
No. 199, CHUNG SHENG ROAD
HSIN TIEN CITY, TAIPEI, TAIWAN R.O.C.
TEL: (02) 2217-0894
FAX: (02) 2217-1254



FCC, VCCI, CISPR, CE
UL, CSA, TÜV, VDE

U.S.A. : P.O.BOX 612650, SAN JOSE, CA 95161-2650
TAIPEI : P.O.BOX 17-82, HSIN TIEN, TAIWAN, R.O.C.

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1. VERIFICATION OF COMPLIANCE

COMPANY NAME: LABWAY CORPORATION
7F, NO. 150, JIAN YI ROAD, CHUNG HO CITY,
TAIPEI HSIEN, TAIWAN, R. O. C.

CONTACT PERSON: Chris Fong / ASST. VICE PRESIDENT

TELEPHONE NO: 8226-5788

MODEL NO/NAME: A521-W0

FCC ID: LWHA521-W0

SERIAL NO: N/A

DATE TESTED: March 13, 2002

TYPE OF EQUIPMENT:	INFORMATION TECHNOLOGY EQUIPMENT (ITE)
MEASUREMENT DISTANCE:	() 3 METER (X) 10 METER
TECHNICAL LIMIT:	Class B
FCC RULES:	PART 15 – Subpart(B) / CISPR 22 limit applied
MEASUREMENT PROCEDURE	ANSI C63.4:92
EQUIPMENT AUTHORIZATION PROCEDURE	CERTIFICATION
MODIFICATION MADE ON EUT	☐ YES ☒ NO
DEVIATIONS FROM MEASUREMENT PROCEDURE	☐ YES (refer to section 21 for comments) ☒ NO
RADIATED EMISSION TEST RESULT	-2.73 dB @ 615.250 MHz / HORIZONTAL
CONDUCTED EMISSION TEST RESULT	-4.05 dB @ 0.152 MHz / L2

The above equipment was tested by Compliance Engineering Services, Inc. for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved By



RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES .

SYSTEM DESCRIPTION

EUT Test Procedure:

1. Windows XP Boots System.
2. Run Winemc.Exe To Activate All Peripherals And Display “H” Pattern On Monitor Screen.
3. Run Media Play Software to Play CD Music.

PRODU INFORMATION

Housing Type:	N/A
EUT Power Rating:	DC 5V/12V to Host PC
AC power during Test:	110VAC, 60Hz to Host PC Power Supply
Power Supply Manufacturer:	SNAKE
Power Supply Model Number:	KYP-250ATX
AC Power Cord Type:	Unshielded, 1.8m (Detachable)
OSC/Clock Frequencies :	14.318MHz

I/O Port of EUT:

I/O PORT TYPES	Q' TY	TESTED WITH
1). Phone Jack	4	4
2). Game Port	1	1

Note: N/A

SUPPORT EQUIPMENT

External Peripheral Devices:

No	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	PS/2 Mouse	MS-S34	LZC01169895	DZL211029	LOGITECH	Unshielded, 1.8 m	N/A
2.	PS/2 Keyboard	6311-TW4C/6	N/A	DoC	ACER	Unshielded, 1.7 m	N/A
3.	Mic. & Ear.	MSB-206	N/A	N/A	E.SENSE	Unshielded, 2.1 m	N/A
4.	Player	RQ-L317	N/A	N/A	PANASONIC	Unshielded, 1.0 m	N/A
5.	Joystick	SIDEWINDER PRECISION PRO	N/A	DoC	MICROSOFT	Unshielded, 1.4 m	N/A
6.	Printer	KX-P1080i	N/A	ACJ5Z6KX-P1080i	PANASONIC	Shielded, 1.7 m	Unshielded, 1.8 m
7.	Monitor	1900FP	N/A	DoC	SAMSUNG	Shielded, 1.8 m	Shielded, 1.8 m with a core
8.	Host PC	TUV4X	HS-20	DoC	VIVA	N/A	Unshielded, 1.8 m
9.	Modem	1414	N/A	IFAXDM1414	ACEEX	Shielded, 1.4 m	Unshielded, 1.8m
10.	Speakers	EM-612	N/A	N/A	OZAKI	Unshielded, 1.5 m	Unshielded, 1.4m

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

MEASUREMENT PROCEDURE

(PRELIMINARY LINE CONDUCTED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) The EUT received DC 5V/12V power through Host PC and Line Impedance Stabilization Network (LISN) which supplied power source of 110VAC/ 60Hz and was grounded to the ground plane.
- 5) All support equipment received power from a second LISN supplying power of 110VAC/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

Mode:

No.	Mode of operation	Date	Data Report/Plot No.
1	Normal Mode	03/13/2002	0005C#(11, 30)

- 10) After the preliminary scan, we found the following test mode(s) producing the highest emission level.

Mode: 1.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

MEASUREMENT PROCEDURE

(FINAL LINE CONDUCTED EMISSION TEST)

- 1) EUT and support equipment was set up on the test bench as per step 10 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Q.P. mode, then the emission signal was re-checked using an Average detector.
- 3) The test data of the worst case condition(s) was reported on the Summary Data page.

Data Sample:

Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Margin (dB)	Reading Type (P/Q/A)	Line (L1/L2)
x.xx	x.xx	x.xx	38.38	56.00	-17.62	P	L1

C.F.(Correction Factor)=Insertion Loss + Cable Loss

Corrected Reading = Metering Reading + C.F.

Margin=Corrected Reading - Limits

P=Peak Reading

L1=Hot

Q=Quasi-peak

L2=Neutral

A=Average Reading

Comments: N/A

LINE CONDUCTED EMISSION LIMIT

Frequency	Maximum RF Line Voltage	
	Q.P.	AVERAGE
150kHz-500kHz	66-56dBuV	56-46dBuV
500kHz-5MHz	56dBuV	46dBuV
5MHz-30MHz	60dBuV	50dBuV

Note: The lower limit shall apply at the transition frequency.

MEASUREMENT PROCEDURE (PRELIMINARY RADIATED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) The EUT received DC 5V/12V power source from Host PC and outlet socket under the turntable. All support equipment received 110VAC/60Hz to power from another socket under the turntable, if any.
- 5) The antenna was placed at 3 meter away from the EUT as stated in ANSI C63.4: 1992. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The following test mode(s) were scanned during the preliminary test:

Mode:

No.	Mode of operation	Date	Data Report/Plot No.
1	Normal Mode	03/13/2002	0005E#(01, 02)

- 8) After the preliminary scan, we found the following test mode(s) producing the highest emission level.

Mode: 1.

Then, the EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for reference of final testing.

MEASUREMENT PROCEDURE

(FINAL RAIDATED EMISSION TEST)

- 1) EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- 2) The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 3) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Peak reading is presented. If EUT emission level was less-2dB to the limit, then the emission signal was re-checked using a Q.P. detector.
- 4) The test data of the worst case condition(s) was reported on the Summary Data page.

Data Sample:

Freq (MHz)	Meter Reading (dBuV)	C.F. (dB/m)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type P/Q/A	Pol. H/V
x.xx	x.xx	x.xx	30.82	37.00	-5.18	P	V

C.F.(Correction Factor)=Antenna Factor + Cable Loss + Attenuator(3/6 dB) - Amplifier Gain

Corrected Reading = Metering Reading + C.F.

Margin=Corrected Reading – Limits

P=Peak Reading

Q=Quasi-peak

A=Average Reading

H=Horizontal Polarization/Antenna

V=Vertical Polarization/Antenna

Comments: **N/A**

RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBu V/m/ Q.P.)
30-230	10	30
230-1000	10	37

Note: The lower limit shall apply at the transition frequency.

SUMMARY DATA (LINE CONDUCTED TEST)

Model Number: A521-W0**Location:** Conducted Room**Tested by:** James Liao**Test Model:** Mode 1**Test Results:** Passed**Temperature:** 24°C**Humidity:** 72%RH

(The chart below shows the highest readings taken from the final data)

Frequency Range Investigated (150 kHz TO 30 MHz)							
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Margin (dB)	Reading Type (P/Q/A)	Line (L1/L2)
0.273	55.17	0.02	55.19	61.03	-5.84	P	L1
0.273	44.93	0.02	44.95	51.03	-6.08	A	L1
0.393	49.23	0.05	49.28	57.99	-8.71	P	L1
0.393	42.57	0.05	42.62	47.99	-5.37	A	L1
0.516	50.58	0.05	50.63	56.00	-5.37	P	L1
0.516	40.24	0.05	40.29	46.00	-5.71	A	L1
0.817	48.22	0.07	48.29	56.00	-7.71	P	L1
0.817	33.26	0.07	33.33	46.00	-12.67	A	L1
0.152	57.34	0.02	57.36	65.91	-8.55	P	L2
0.152	51.82	0.02	51.87	55.91	-4.05	A	L2
0.273	52.50	0.02	52.52	61.03	-8.51	P	L2
0.273	42.38	0.02	42.40	51.03	-8.63	A	L2

C.F.(Correction Factor)=Insertion Loss + Cable Loss

Corrected Reading = Metering Reading + C.F.

Margin=Corrected Reading - Limits

P=Peak Reading

L1=Hot

Q=Quasi-peak

L2=Neutral

A=Average Reading

Comments: N/A

SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: A521-W0**Location:** Site # E**Tested by:** James Liao**Polar:** Vertical / Horizontal– 10m**Test Mode:** Mode 1**Test Results:** Passed**Temperature:** 24°C**Humidity:** 72%RH

(The chart below shows the highest readings taken from the final data)

Frequency Range Investigated (30 MHz TO 1000 MHz)							
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB/m)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type P/Q/A	Pol. H/V
429.790	36.40	-4.06	32.34	37.00	-4.66	P	V
452.910	35.95	-3.76	32.19	37.00	-4.81	P	V
509.610	34.79	-2.86	31.93	37.00	-5.07	P	V
615.210	33.43	-0.23	33.20	37.00	-3.80	P	V
507.600	34.79	-2.91	31.88	37.00	-5.12	P	H
615.250	34.50	-0.23	34.27	37.00	-2.73	P	H

C.F.(Correction Factor)=Antenna Factor + Cable Loss - Amplifier Gain (+ Attenuator 3dB)

Corrected Reading = Metering Reading + C.F.

Margin=Corrected Reading - Limits

P=Peak Reading

H=Horizontal Polarization/Antenna

Q=Quasi-peak

V=Vertical Polarization/Antenna

A=Average Reading

Comments: N/A

TEST EQUIPMENT LIST (EMISSION)

Instrumentation: The following list contains equipment used at Compliance Engineering Services, Inc.. for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2-1988 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 9kHz to 1.0 / 2.0 GHz.

Equipment used during the tests:

☒ **Open Area Test Site:** #E

Equipment	Manuf.	Model No.	Serial No.	Cal Date	Due Date
SPECTRUM ANALYZER	H.P.	8566B	2937A06102	06/06/01	06/05/02
SPECTRUM DISPLAY	H.P.	85662A	2848A18276	06/06/01	06/05/02
QUASI-PEAK DETECTOR	H.P.	85650A	2811A01439	06/07/01	06/06/02
AMPLIFIER	H.P.	8447D A	2727A05764	05/07/01	05/06/02
ANTENNA	EMCO	3142	1310	06/30/01	06/29/02
CABLE	BELDEN	9913	N-TYPE07	01/02/02	01/01/03

☒ **Conducted Area Test Site:** Conducted Room

Equipment	Manuf.	Model No.	Serial No.	Cal Date	Due Date
TEST RECEIVER	R&S	ESHS20	840455/006	03/15/01	03/14/02
LISN	SOLAR	8012-50-R-24-BNC	8305114	07/23/01	07/22/02
LISN(EUT)	EMCO	3825/2	1435	01/16/02	01/15/03

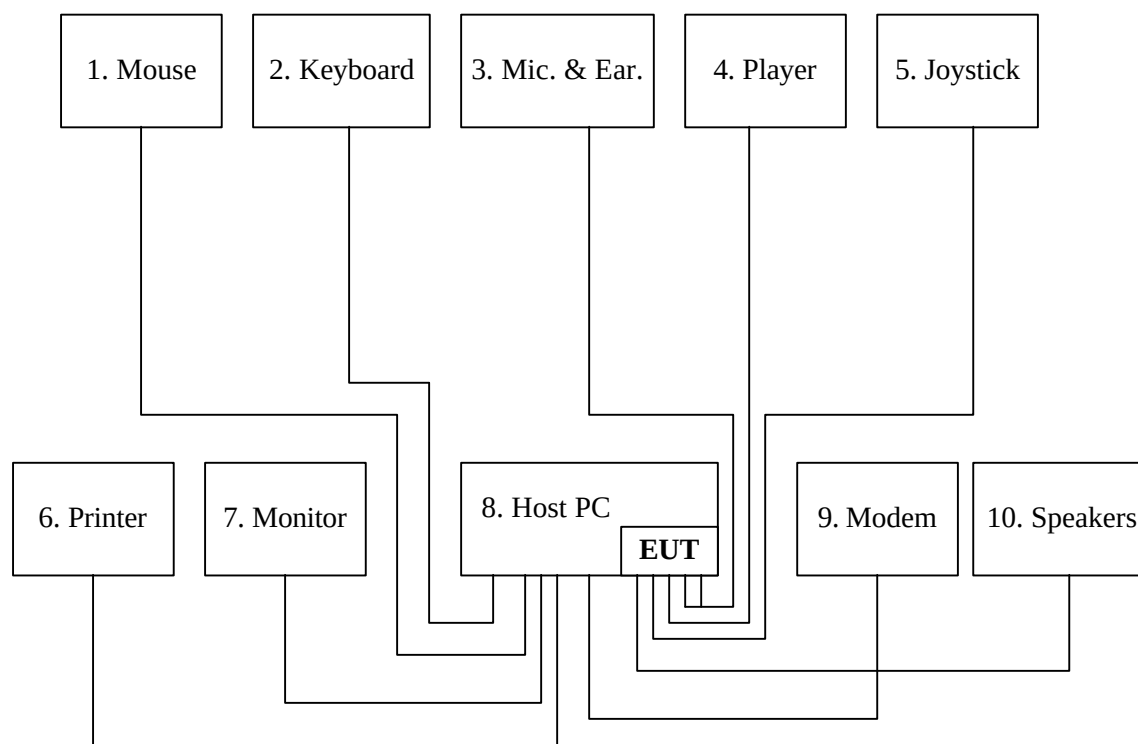
The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators

EUT: C-Media CMI8738 PCI Sound Card

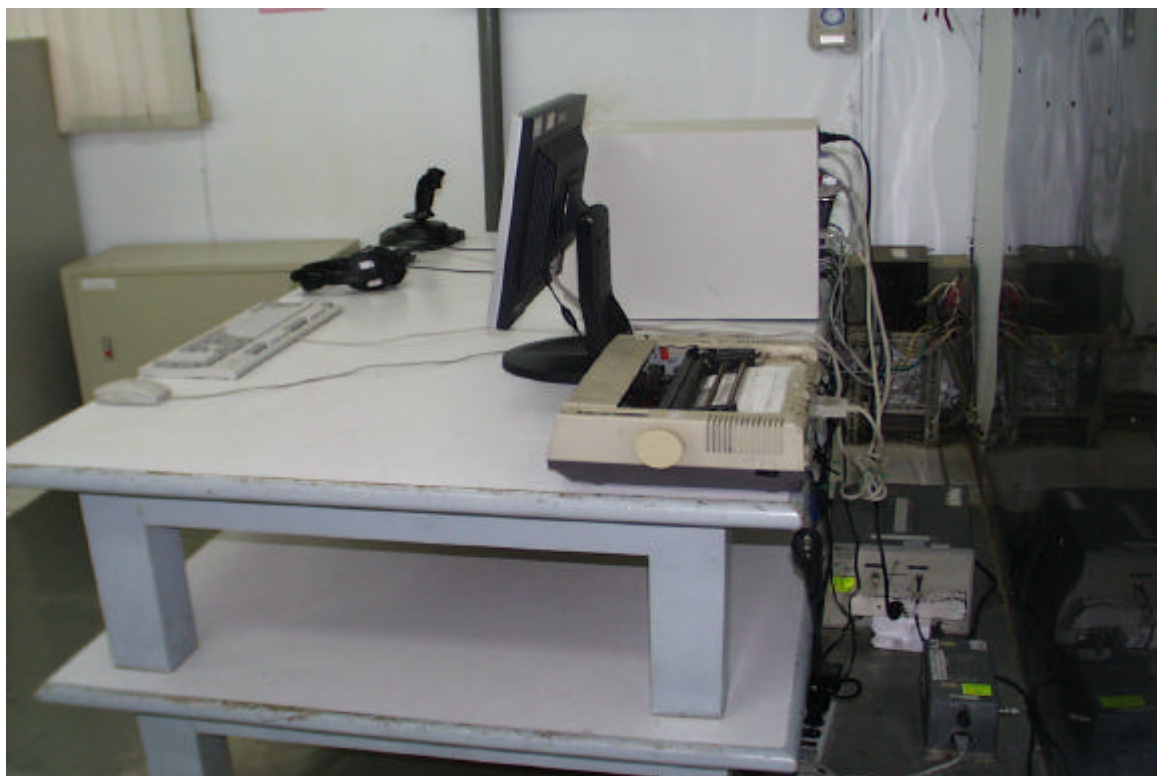
Model Number: A521-W0



APPENDIX 1

PHOTOGRAPHS OF TEST SETUP (TEST SETUP OF LINE CONDUCTED EMISSION)

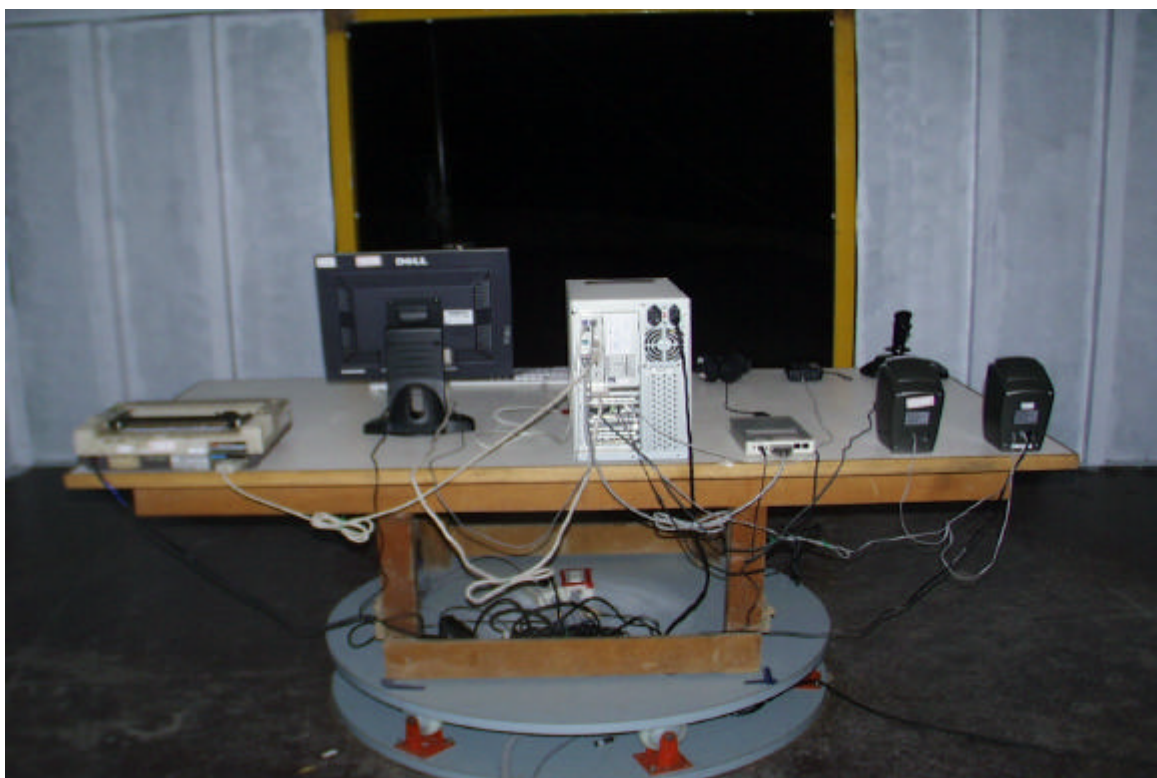
LINE CONDUCTED EMISSION TEST



APPENDIX 2

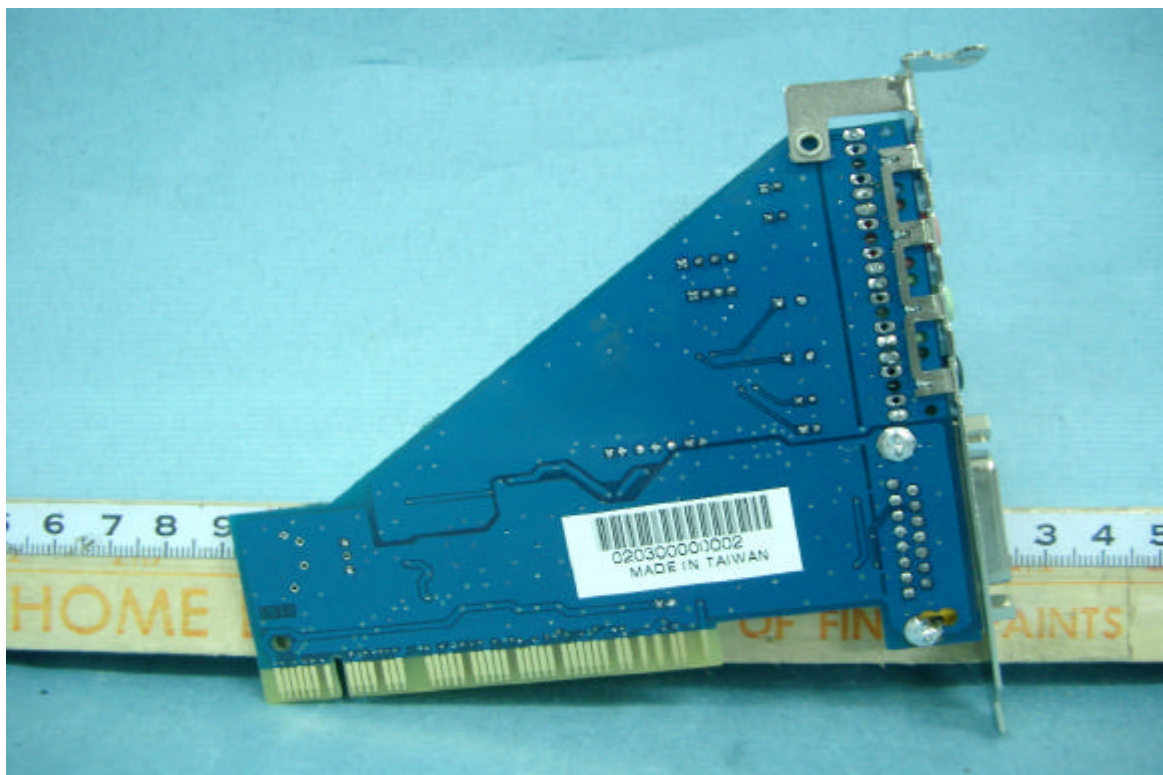
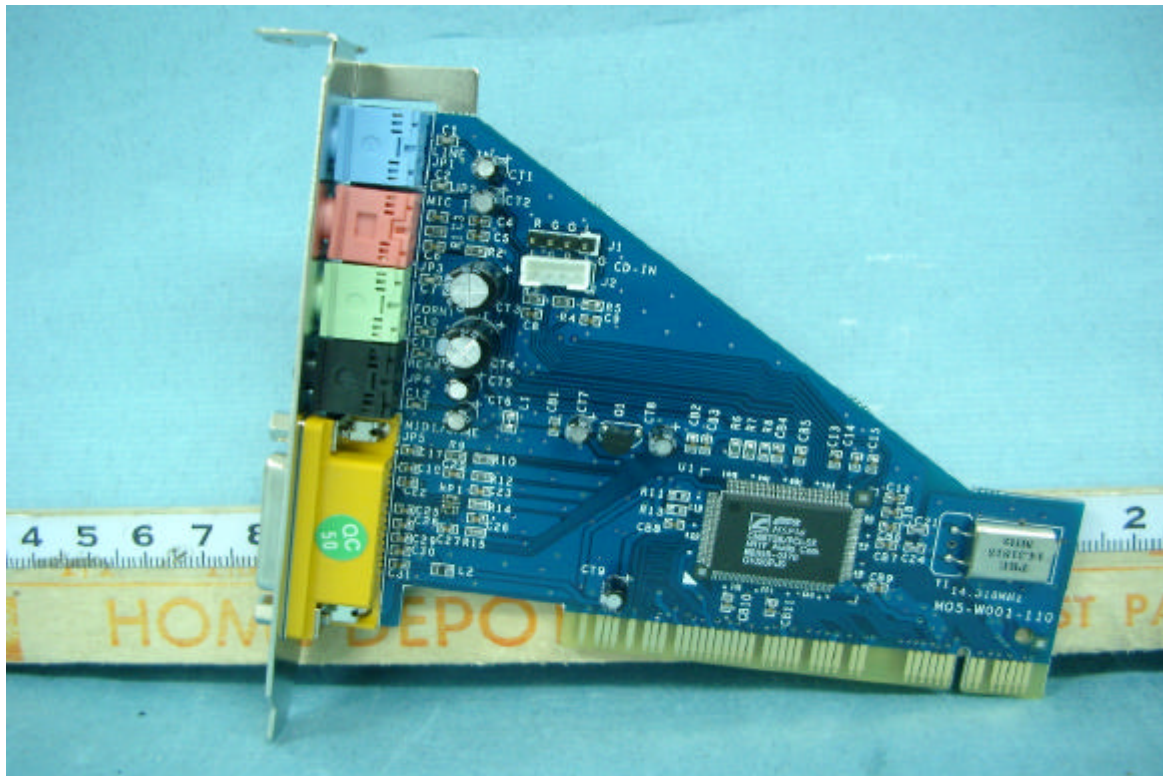
PHOTOGRAPHS OF TEST SETUP (TEST SETUP OF LINE RADIATED EMISSION)

RADIATED EMISSION TEST



APPENDIX 3

PHOTOGRAPHS OF EUT



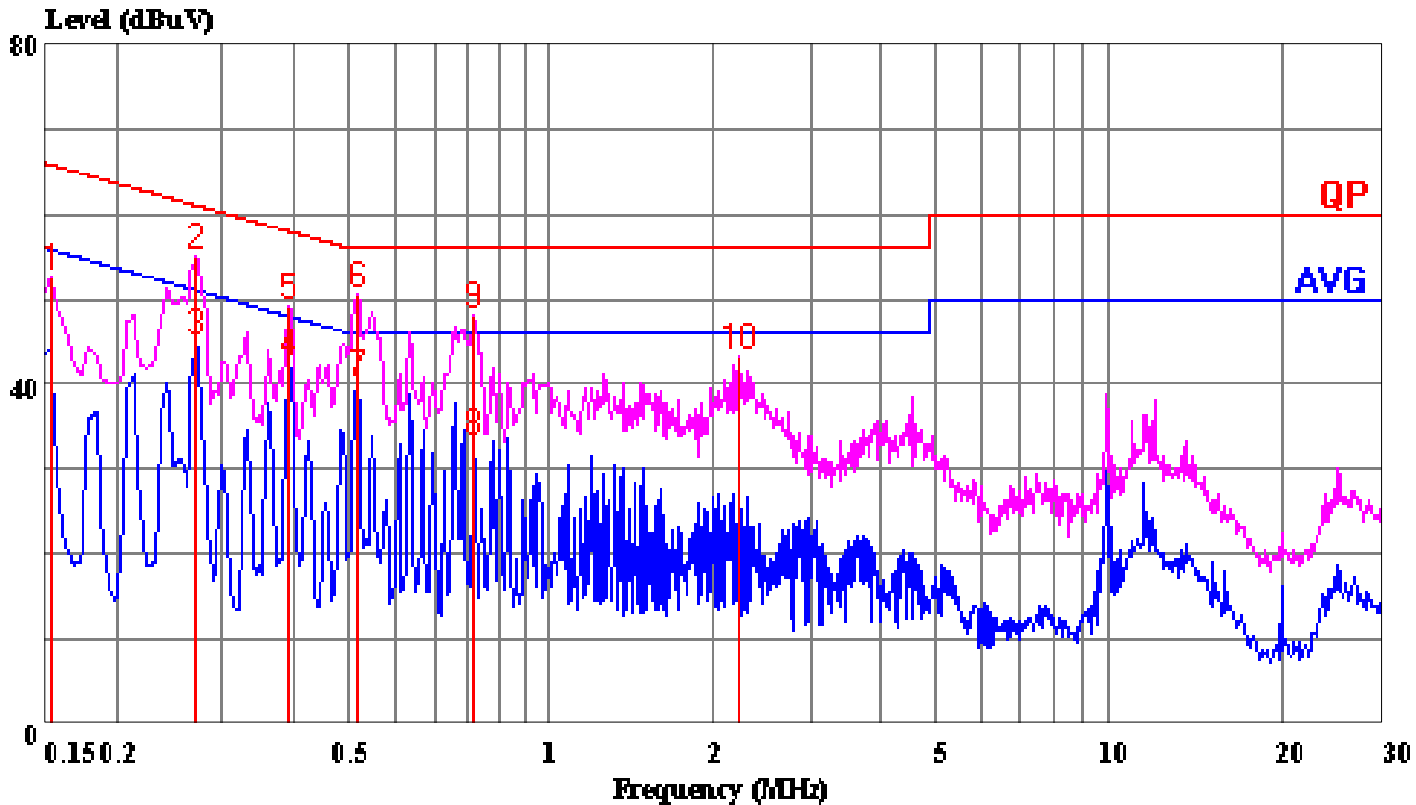


APPENDIX 4

CONDUCTED EMISSION PLOT RADIATED EMISSION DATA

Data#: 11 File#: 0005c.emi

Date: 2002-03-13 Time: 16:45:43



(CES Conducted)

Trace: 7 8

Ref Trace:

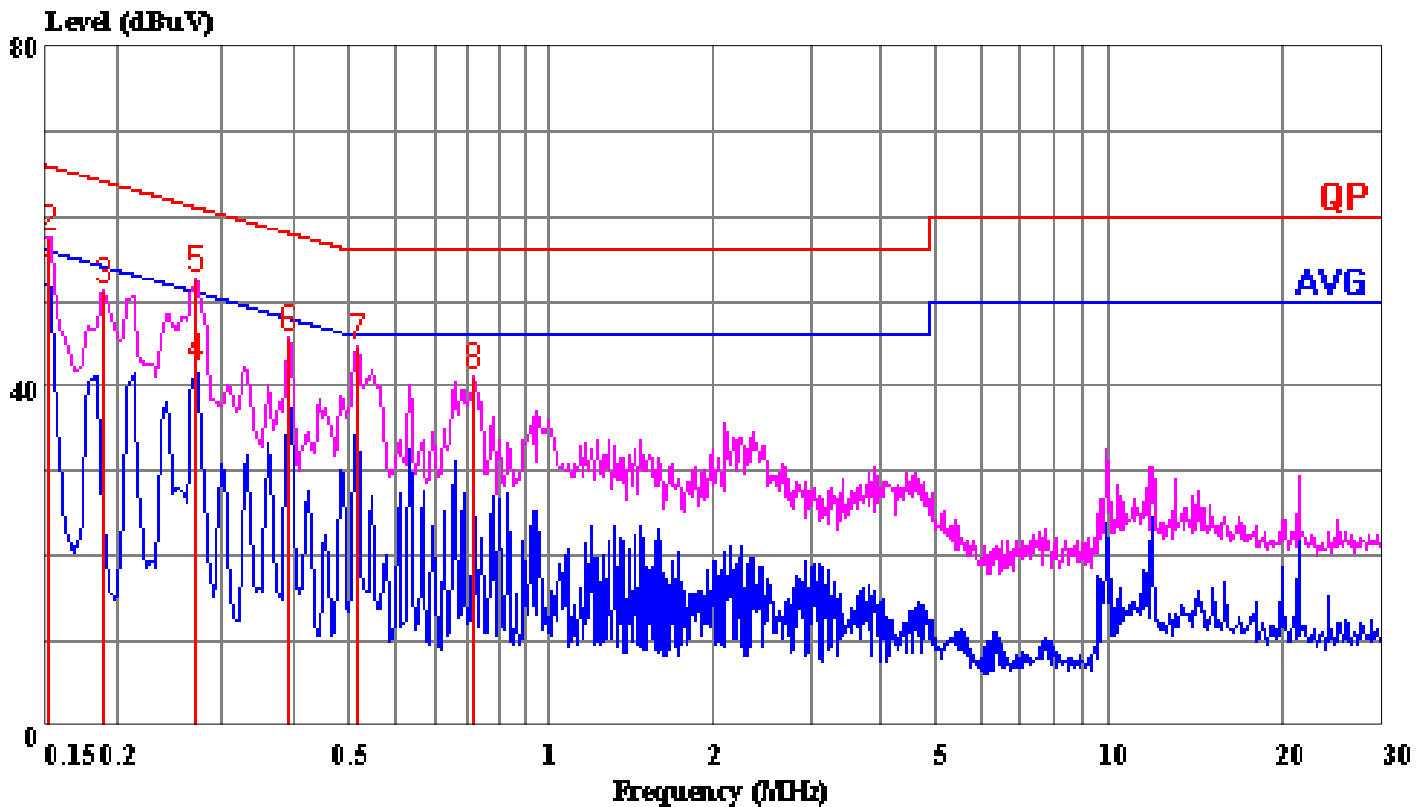
Condition: LINE
Report No. : 02E0005
Test Engr. : JAMES LIAO
Company : LABWAY CORPORATION
EUT : A521-W0
Test Config : EUT/ ALL PERIPHERALS
Type of Test: FCC CLASS B W/ EN 55022 CLASS B LIMIT
Mode of Op. : NORMAL MODE

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	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.153	52.56	0.02	52.58	65.82	-13.24	Peak
2	0.273	55.17	0.02	55.19	61.03	-5.84	Peak
3	0.273	44.93	0.02	44.95	51.03	-6.08	Average
4	0.393	42.57	0.05	42.62	47.99	-5.37	Average
5	0.393	49.23	0.05	49.28	57.99	-8.71	Peak
6	0.516	50.58	0.05	50.63	56.00	-5.37	Peak
7	0.516	40.24	0.05	40.29	46.00	-5.71	Average
8	0.817	33.26	0.07	33.33	46.00	-12.67	Average
9	0.817	48.22	0.07	48.29	56.00	-7.71	Peak
10	2.346	42.98	0.15	43.13	56.00	-12.87	Peak

Data#: 30 File#: 0005c.emi

Date: 2002-03-13 Time: 17:02:21



(CES Conducted)

Trace: 26 27

Ref Trace:

Condition: NEUTRAL
Report No. : 02E0005
Test Engr. : JAMES LIAO
Company : LABWAY CORPORATION
EUT : A521-W0
Test Config : EUT/ ALL PERIPHERALS
Type of Test: FCC CLASS B W/ EN 55022 CLASS B LIMIT
Mode of Op. : NORMAL MODE

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	51.85	0.02	51.87	55.91	-4.05	Average
2	0.152	57.34	0.02	57.36	65.91	-8.55	Peak
3	0.188	51.30	0.02	51.32	64.11	-12.79	Peak
4	0.273	42.38	0.02	42.40	51.03	-8.63	Average
5	0.273	52.50	0.02	52.52	61.03	-8.51	Peak
6	0.393	45.77	0.05	45.82	57.99	-12.17	Peak
7	0.516	44.69	0.05	44.74	56.00	-11.26	Peak
8	0.817	41.10	0.07	41.17	56.00	-14.83	Peak

Data#: **1** File#: 0005e.emi
Compliance E-Site

Date: 2002-03-13 Time: 17:44:37

Condition: VERTICAL / 10m
Report No. : 02E0005
Test Engr. : JAMES LIAO
Company : LABWAY CORPORATION
EUT : A521-W0
Test Config : EUT/ALL PERIPHERALS
Type of Test: FCC CLASS B W/ EN 55022 CLASS B LIMIT
Mode of Op. : NORMAL MODE

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	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	114.540	38.50	-15.68	22.82	30.00	-7.18	Peak
2	188.780	35.33	-12.05	23.28	30.00	-6.72	Peak
3	240.010	36.67	-8.74	27.93	37.00	-9.07	Peak
4	319.470	34.62	-6.64	27.98	37.00	-9.02	Peak
5	368.720	34.74	-5.28	29.46	37.00	-7.54	Peak
6	429.790	36.40	-4.06	32.34	37.00	-4.66	Peak
7	452.910	35.95	-3.76	32.19	37.00	-4.81	Peak
8	509.610	34.79	-2.86	31.93	37.00	-5.07	Peak
9	615.210	33.43	-0.23	33.20	37.00	-3.80	Peak

Data#: 2 File#: 0005e.emi
Compliance E-Site

Date: 2002-03-13 Time: 18:41:57

Condition: HORIZONTAL / 10m
Report No. : 02E0005
Test Engr. : JAMES LIAO
Company : LABWAY CORPORATION
EUT : A521-W0
Test Config : EUT/ALL PERIPHERALS
Type of Test: FCC CLASS B W/ EN 55022 CLASS B LIMIT
Mode of Op. : NORMAL MODE

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	114.570	35.72	-15.68	20.04	30.00	-9.96	Peak
2	188.890	34.66	-12.05	22.61	30.00	-7.39	Peak
3	240.080	36.53	-8.74	27.79	37.00	-9.21	Peak
4	319.430	32.61	-6.64	25.97	37.00	-11.03	Peak
5	366.930	33.03	-5.34	27.69	37.00	-9.31	Peak
6	429.640	34.08	-4.06	30.02	37.00	-6.98	Peak
7	452.890	34.57	-3.76	30.81	37.00	-6.19	Peak
8	507.600	34.79	-2.91	31.88	37.00	-5.12	Peak
9	615.250	34.50	-0.23	34.27	37.00	-2.73	Peak