



## Testing Report



**Equipment Under Test :** 2 port Combo Free KVM Switch

**Model Number :** KCF121A

**Serial No. :** KCF121

**Applicant :** Omnidirectional Control Technology Inc.

**Address of Applicant :** 8F-2, No.94, Pao-Chung Rd., Hsin-Tien  
City, 231 Taipei Hsien, Taiwan R.O.C.

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# Verification

<b>Applicant:</b>	Omnidirectional Control Technology Inc.
<b>Manufacturer:</b>	Omnidirectional Control Technology Inc.
<b>EUT Description:</b>	2 port Combo Free KVM Switch
<b>Model No.:</b>	KCF121A
<b>Serial No.:</b>	KCF121
<b>Sample received date :</b>	2006-03-31
<b>Test Standards :</b>	<input checked="" type="checkbox"/> ANSI C63.4 & Part 15 B and CISPR 22 Class B

This report details the results of the testing carried out on one sample. The test results are contained in this test report and Matrix Test Laboratory assumes full responsibility for the accuracy and completeness of these Tests. This report shows the EUT is technically compliant with the ANSI C63.4 & Part 15 B and CISPR 22 Class B official requirements. This report applies to the above sample only and shall not be reproduced in part without written approval of Matrix Test Laboratory.

**Documented:**  **Date:** 2006-04-19  
Jody Peng/ ADM. Dept Staff

**Test Engineer:**  **Date:** 2006-04-18  
Louis Chou/ ENG. Dept. Staff

**Approved:**  **Date:** 2006-04-19  
Peter Chin/ Head of Laboratory

# 1 General Description

## 1.1 Description of EUT

<b>Equipment Under Test</b>	:	2 port Combo Free KVM Switch
<b>Model Number</b>	:	KCF121A
<b>Serial Number</b>	:	KCF121
<b>Applicant Address of Applicant</b>	:	Omnidirectional Control Technology Inc. 8F-2, No.94, Pao-Chung Rd., Hsin-Tien City, 231 Taipei Hsien, Taiwan R.O.C.
<b>Manufacturer Address of Manufacturer</b>	:	Omnidirectional Control Technology Inc. 8F-2, No.94, Pao-Chung Rd., Hsin-Tien City, 231 Taipei Hsien, Taiwan R.O.C.
<b>Power Supply</b>	:	DC 5V
<b>Data Cable</b>	:	<input checked="" type="checkbox"/> VGA Cable <input checked="" type="checkbox"/> Shielded <input type="checkbox"/> Non-Shielded <input checked="" type="checkbox"/> Detachable ,1.8m <input type="checkbox"/> Un-detachable <input checked="" type="checkbox"/> w/o ferrite core <input checked="" type="checkbox"/> Audio Cable <input type="checkbox"/> Shielded <input checked="" type="checkbox"/> Non-Shielded <input checked="" type="checkbox"/> Detachable ,1.8m <input type="checkbox"/> Un-detachable <input checked="" type="checkbox"/> w/o ferrite core
<b>Description of EUT</b>	:	<p><b>Dimensions</b> : 14 cm X 7.5 cm X 4.5 cm</p> <p><b>Weight</b> : 450 g</p> <p><b>Intended function</b> : The EUT is a KVM switch, which allows a user to control multiple computers from a single keyboard, mouse and monitor.</p> <p><b>Product Variant</b> : The manufacturer declares that the serial products share the identical circuit design. The difference between serial product and main test sample is that the serial product does not have audio input port as the main test sample. Matrix only takes the responsibility to the main test sample.</p>

## 1.2 Tested Supporting Units

### 1.2.1 Personal Computer

PC01

<b>Model Number</b>	:	HP Pavilion 743
<b>Serial Number</b>	:	TW25121617
<b>EMC Approved</b>	:	R33001
<b>Manufacturer</b>	:	HP
<b>Switching Power Supply</b>	:	BESTEC M/N :ATX-1956A S/N :BST ATX-1956A P1 EMC Approved :4902A033
<b>3.5" Floppy Driver</b>	:	MITSUMI M/N :D359M3D S/N :D359M3D4102002G17BY569 EMC Approved :62001002
<b>Hard Disk Driver</b>	:	SAMSONG M/N :SV4002H S/N :0412J1FTB55615 EMC Approved :D33020
<b>CD-Rom</b>	:	HP M/N :DVD WRITER 2000I S/N :N/A EMC Approved :N/A
<b>Serial/Parallel Card</b>	:	Within Mother Boar
<b>Video Card</b>	:	Within Mother Boar
<b>Power Cord</b>	:	Non-shielded, Detachable, 1.5m

## PC02

<b>Model Number</b>	:	HP Pavilion 222
<b>Serial Number</b>	:	TWL33100KD
<b>EMC Approved</b>	:	R33001
<b>Manufacturer</b>	:	HP
<b>Switching Power Supply</b>	:	HIPRO M/N:HP-D2537F3H S/N:5187-1100 EMC Approved: D33036
<b>3.5" Floppy Driver</b>	:	N/A
<b>Hard Disk Driver</b>	:	Western Digital M/N: WD80BB-00DKAO S/N:WMAHL2771668 EMC Approved: D33015
<b>CD-Rom</b>	:	HP M/N:DVD WRITER 2000I S/N: N/A EMC Approved : N/A
<b>VGA Card</b>	:	M/N: A180DDR 64M S/N:L3090152690 L3090149683 EMC Approved: D33004
<b>Serial/Parallel Card</b>	:	Within Mother Boar
<b>Video Card</b>	:	Within Mother Boar

## 1.2.2 Monitor

<b>Model Number</b>	:	GC577
<b>Serial Number</b>	:	313FWNL2000031
<b>EMC Approved</b>	:	3902A178
<b>Manufacturer</b>	:	GENUINE
<b>Data Cable</b>	:	VGA CABLE Shielded, Un-detachable, 1.5m

## 1.2.3 PS2 Keyboard

<b>Model Number</b>	:	5181
<b>Serial Number</b>	:	BL24613476
<b>EMC Approved</b>	:	3892C981
<b>Manufacturer</b>	:	HP

## 1.2.4 PS2 Mouse

<b>Model Number</b>	:	MO42KOA
<b>Serial Number</b>	:	0306052598
<b>EMC Approved</b>	:	R41108
<b>Manufacturer</b>	:	HP

## 1.2.5 USB Mouse

<b>Model Number</b>	:	828 U+P(GM3S-668)
<b>Serial Number</b>	:	668200301023205
<b>EMC Approved</b>	:	3902C180
<b>Manufacturer</b>	:	Genuine
<b>Data Cable</b>	:	USB CABLE Non-shielded, Un-detachable, 1.5m

## 1.2.6 Printer

<b>Model Number</b>	:	HP DJ3820 PRINTER
<b>Serial Number</b>	:	CN33V180TR
<b>EMC Approved</b>	:	3912H007
<b>Manufacturer</b>	:	HP
<b>Data Cable</b>	:	N/A
<b>Power Cord</b>	:	Non-shielded, Detachable, 1.5M

## 1.2.7 Modem

<b>Model Number</b>	:	MD-56K
<b>Serial Number</b>	:	1234A036998
<b>EMC Approved</b>	:	3882B582
<b>Manufacturer</b>	:	LEMEL
<b>Data Cable</b>	:	N/A
<b>Power Adapter</b>	:	CLASS 2 POWER SUPPLY

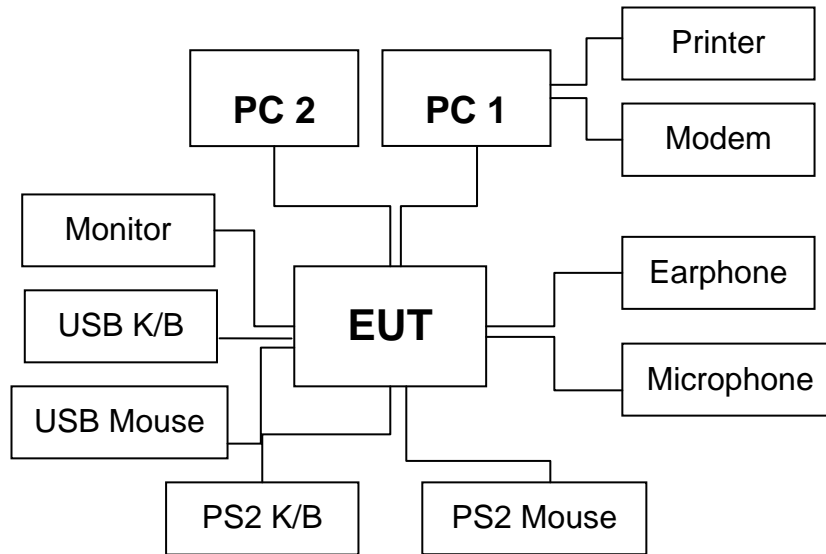
## 1.2.8 Microphone

<b>Model Number</b>	:	M25N21
<b>Serial Number</b>	:	N/A
<b>EMC Approved</b>	:	CE
<b>Manufacturer</b>	:	Logitech
<b>Data Cable</b>	:	Audio cable, Un-detachable, 1m

## 1.2.9 Earphone

<b>Model Number</b>	:	CURVE-460
<b>Serial Number</b>	:	N/A
<b>EMC Approved</b>	:	N/A
<b>Manufacturer</b>	:	Labtec

### 1.3 Block Diagram



### 1.4 Decision of Final Test Mode:

Winfcc (1024x768) & Play MP3 mode

### 1.5 Test Facility

<b>Site Description</b>	:	All tests are completed by Matrix Test Laboratory. Radiated emission is performed at HongAn's open-site.
<b>Name of Firm</b>	:	Matrix Test Laboratory
<b>Site Location</b>	:	2F, No 146, Jian Yi Rd, Chung-Ho City, Taipei Hsien, Taiwan, R.O.C.

#### 1.5.1 Test Methodology

Both conducted and Radiated Emission Test were performed according to the procedures in ANSI C63.4-1992 & FCC PART 15 B and CISPR 22 Class B : 1997 / A1: 2000. Radiated Emission Test was performed at 10 meters distance from antenna to EUT.

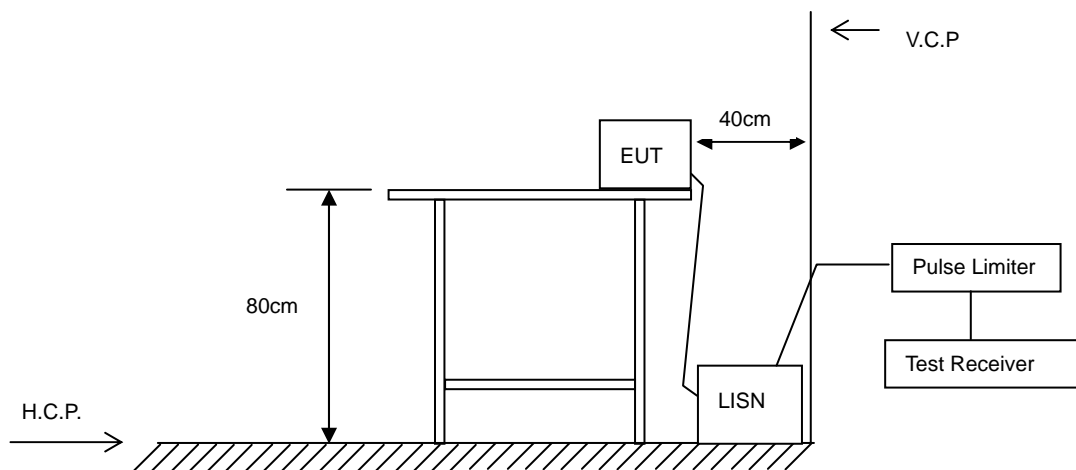
## 2 Conducted Emission Test

### 2.1 Test Instruments

Instrument	Manufacturer	Model	Serial No.	Date of Calibration
EMI RECEIVER	AFJ	ER 55 CR/2.8	55309930144	2005-07-26
L.I.S.N.	Mess Tec	NNB-2/16Z	03/1006	2005-03-07
Pulse Limiter	Mess Tec	PL10	N/A	2005-07-27
RF CABLE	N/A	N/A	N/A	2005-03-14

Note: All Test Instruments upon which need to be calibrated are within calibration period of 1 year.

### 2.2 Configuration of Instrument Setup



### 2.3 Conducted Limit

CISPR 22 / FCC Part 15 B

Frequency (MHz)	<input type="checkbox"/> Class A		<input checked="" type="checkbox"/> Class B	
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 ~ 0.50	79	66	66 to 56	56 to 46
0.50 ~ 5.0	73	60	56	46
5.0 ~ 30	73	60	60	50

### 2.4 Set of Instrument

- 2.4.1 The EMI test receiver frequency range set from 150 KHz to 30 MHz.
- 2.4.2 The EMI test receiver bandwidth set at 9kHz.
- 2.4.3 The EMI test receiver detector set as Quasi-Peak (Q.P.) and Average (AV).

## 2.5 Test Configuration

- 2.5.1 The EUT was placed on a non-conductive table whose total height equaled 80cm and vertical conducting plane located 40cm to the rear of the EUT.
- 2.5.2 The EUT was connected to the main power through Line Impedance Stabilization Networks (LISN). This setup provided a 50ohm/50 $\mu$ H coupling impedance for the measuring equipment. The auxiliary equipment was also connected to the main power through a LISN that provided a 50ohm/50 $\mu$ H coupling impedance with 50ohm termination. (Refer to the block diagram of the test setup and photographs.)
- 2.5.3 The conducted disturbance was measured between the phase lead and the reference ground, and between the neutral lead and reference ground. The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.
- 2.5.4 The identification of the frequency of highest disturbance with respect to the limit was found by investigating disturbances at a number of significant frequencies. The probable frequency of maximum disturbance had been found and that the associated cable and EUT configuration and mode of operation had been identified.

## 2.6 Configuration of EUT

- 2.6.1 Setup the EUT and peripheral as shown in section 1.3.
- 2.6.2 Turn on the power of all equipment.
- 2.6.3 Activate the winfcc (1024x768) & play MP3 mode.
- 2.6.4 Measure the Line phase and record value.
- 2.6.5 Change into Neutral phase then measure and record value.

## 2.7 Test Result

### **PASS.**

The final tests data are shown on following pages. The test waveforms are shown on Appendix 1.

### Power Line Conducted Test Data

Date of Tested : 2006-04-12 Power Line : Line  
 Temperature : 23 Humidity : 46%  
 Test Mode : Winfcc (1024x768) & Play MP3 mode

Frequency (MHz)	Factor (dB)	Reading (dBuV)		Measurement (dBuV)		Limits (dBuV)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.680	0.06	43.88	41.99	43.94	42.05	56.00	46.00	-12.06	-3.95
0.850	0.06	43.79	40.28	43.85	40.34	56.00	46.00	-12.15	-5.66
0.910	0.07	43.23	1.99	43.30	2.06	56.00	46.00	-12.70	-43.94
0.970	0.07	43.02	42.72	43.09	42.79	56.00	46.00	-12.91	-3.21
1.300	0.07	48.04	39.72	48.11	39.79	56.00	46.00	-7.89	-6.21
2.400	0.08	44.96	33.30	45.04	33.38	56.00	46.00	-10.96	-12.62

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “\*\*” Means emission level un-detectable.
4. “--” Means do not need detect.

### Power Line Conducted Test Data

Date of Tested : 2006-04-12 Power Line : Neutral  
 Temperature : 23 Humidity : 46%  
 Test Mode : Winfcc (1024x768) & Play MP3 mode

Frequency (MHz)	Factor (dB)	Reading (dBuV)		Measurement (dBuV)		Limits (dBuV)		Margin (dB)	
		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.680	0.06	44.72	41.69	44.78	41.75	56.00	46.00	-11.22	-4.25
0.800	0.06	44.09	42.46	44.15	42.52	56.00	46.00	-11.85	-3.48
0.970	0.07	44.00	42.65	44.07	42.72	56.00	46.00	-11.93	-3.28
1.300	0.07	48.37	42.63	48.44	42.70	56.00	46.00	-7.56	-3.30
2.270	0.08	43.67	33.39	43.75	33.47	56.00	46.00	-12.25	-12.53
2.330	0.08	43.86	31.56	43.94	31.64	56.00	46.00	-12.06	-14.36

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss
3. “\*\*” Means emission level un-detectable.
4. “--” Means do not need detect.

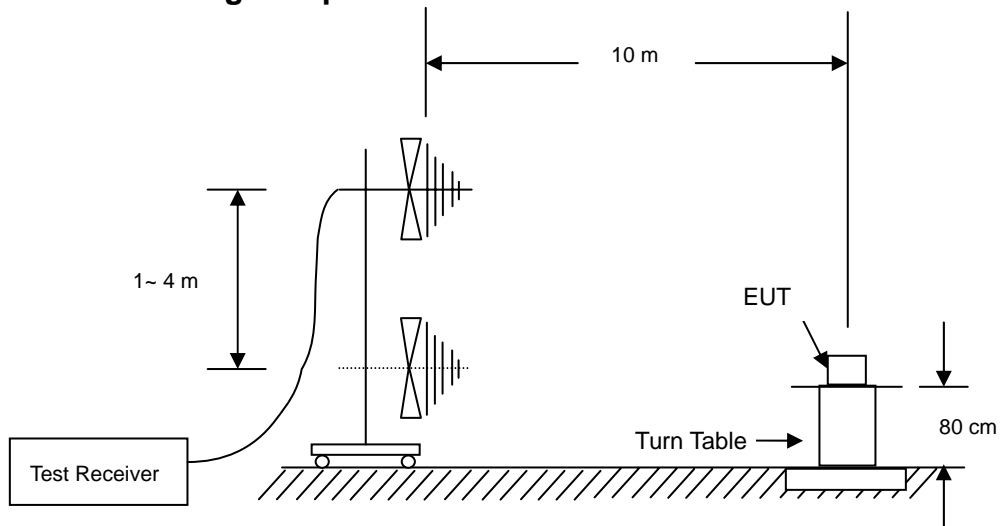
### 3 Radiated Emission Test

#### 3.1 Test Instruments

Instrument	Manufacturer	Model	Serial No.	Date of Calibration
SPECTURM ANALZYER	HP	8595E	3829A03763	2005-07-19
Antenna	FRANKONIA	BTA-H	030001H	2005-03-25
Pre-Amplifier	Schaffner	CPA9231A	N/A	2005-04-24
RF Cable	MIYAZAKI	8D-F8	N/A	2005-04-30
EMI Test Receiver	Rohde & Schwarz	ESI 07	N/A	2005-03-25

Note: All Test Instruments upon which need to be calibrated are within calibration period of 1 year.

#### 3.2 Configuration of Testing Setup



#### 3.3 Radiated Limit

FCC Part 15

Frequency (MHz)	<input type="checkbox"/> Class A (10m)		<input type="checkbox"/> Class B (3m)	
	Field Strength (uV)	Quasi-Peak (dBuV)	Field Strength (uV)	Quasi-Peak (dBuV)
30 ~ 88	90	39.08	100	40.00
88 ~ 216	150	43.52	150	43.52
216 ~ 960	210	46.44	200	46.02
960 above	300	49.54	500	53.98

CISPR 22

Frequency (MHz)	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B
	Quasi-Peak (dBuV)	Quasi-Peak (dBuV)
30 ~ 230	40.0	30.0
230 ~ 1000	47.0	37.0

### 3.4 Set of Instrument

- 3.4.1 The EMI test receiver frequency range set from 30 MHz to 1000 MHz.
- 3.4.2 The EMI test receiver bandwidth set at 120 kHz.
- 3.4.3 The EMI test receiver detector set as Quasi-Peak (Q.P.).

### 3.5 Test Configuration

- 3.5.1 The EUT was placed on a non-conductive table whose total height equaled 80cm. The turntable can rotate 360 degree to determine the position of the maximum emission level.
- 3.5.2 The EUT was set 10 meters away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.
- 3.5.3 The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.
- 3.5.4 The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

### 3.6 Configuration of EUT

- 3.6.1 Setup the EUT and peripheral as shown in section 1.3.
- 3.6.2 Turn on the power of all equipment.
- 3.6.3 Activate the winfcc (1024x768) & play MP3 mode.
- 3.6.4 Measure the horizontal polarization and record the value.
- 3.6.5 Change into vertical polarization measure and record the value.

### 3.7 Test Result

**PASS.**

The final tests data are shown on following pages.

### Radiated Emission Test Data

Date of Tested : 2006-04-12 Polarization : Horizontal  
 Temperature : 25 Humidity : 56%  
 Test Mode : Winfcc (1024x768) & Play MP3 mode

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
30.48	18.21	4.63	22.84	30	-7.16
68.56	6.36	17.53	23.89	30	-6.11
147.82	11.49	16.13	27.62	30	-2.38
73.91	7	26.19	33.19	30	3.19
135.88	12.39	9.24	21.63	30	-8.37
178.82	10.16	17.23	27.39	30	-2.61

Remark:

- All readings are Quasi-Peak values.
- The worst emission was detected at 147.82 MHz with corrected signal level of 27.62 dBuV (limit is 30 dBuV) when the antenna was at horizontal polarization and was at 1 m high and the turntable was at 154°.

### Radiated Emission Test Data

Date of Tested : 2006-04-12 Polarization : Vertical  
 Temperature : 25 Humidity : 56%  
 Test Mode : Winfcc (1024x768) & Play MP3 mode

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV/m)	Margin (dB)
30.48	18.21	11.07	29.28	30	-0.72
49.98	8.57	16.71	25.28	30	-4.72
68	6.35	23.1	29.45	30	-0.55
73.71	6.97	26.26	33.23	30	3.23
135.94	12.39	14.17	26.56	30	-3.44
147.5	11.51	17.43	28.94	30	-1.06

Remark:

- All readings are Quasi-Peak values.
- The worst emission was detected at 68 MHz with corrected signal level of 29.45 dBuV (limit is 30 dBuV) when the antenna was at vertical polarization and was at 4 m high and the turntable was at 320°..

## 4 Photographs of Test

### 4.1 Conducted Emission Test



Front View



Rear View

## 4.2 Radiated Emission Test



Front View



Rear View

## 5 Photographs of EUT



Front View of EUT



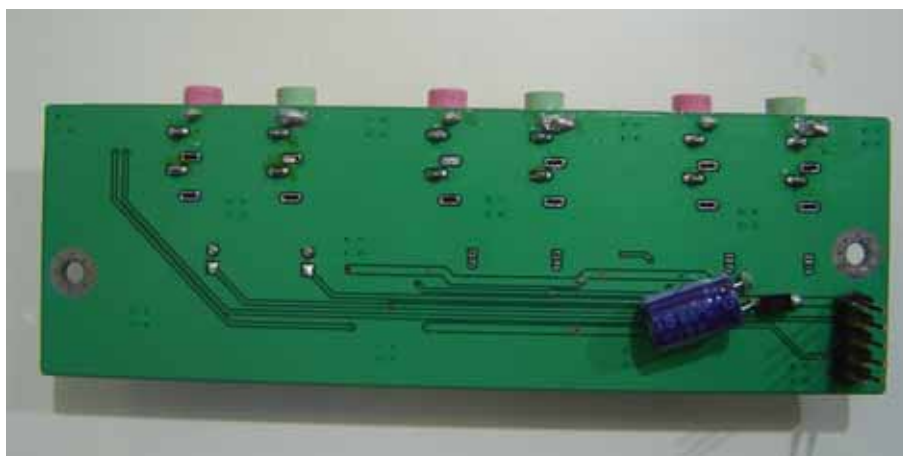
Rear View of EUT



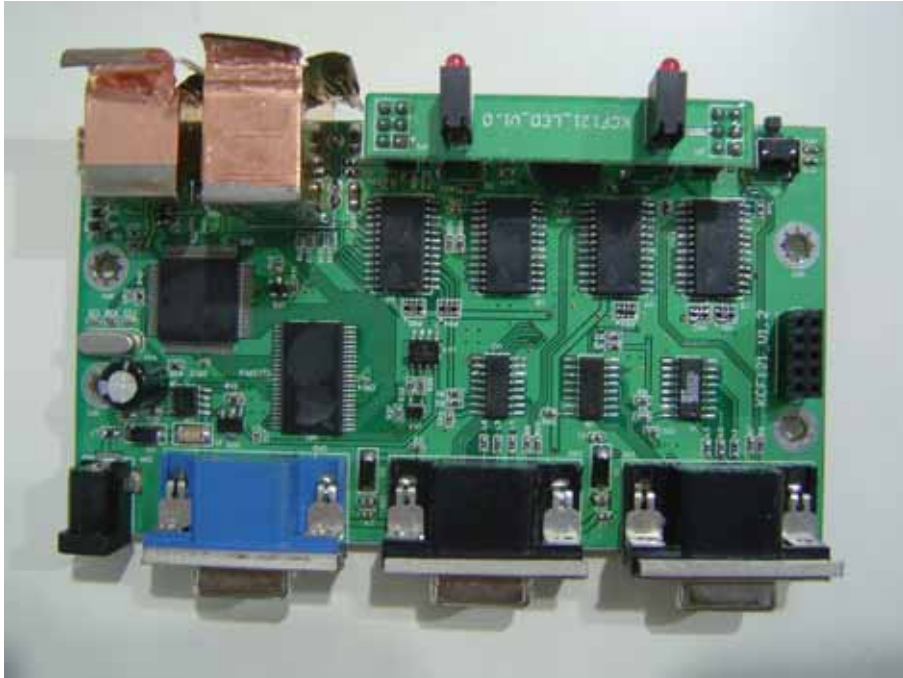
Inside view of EUT



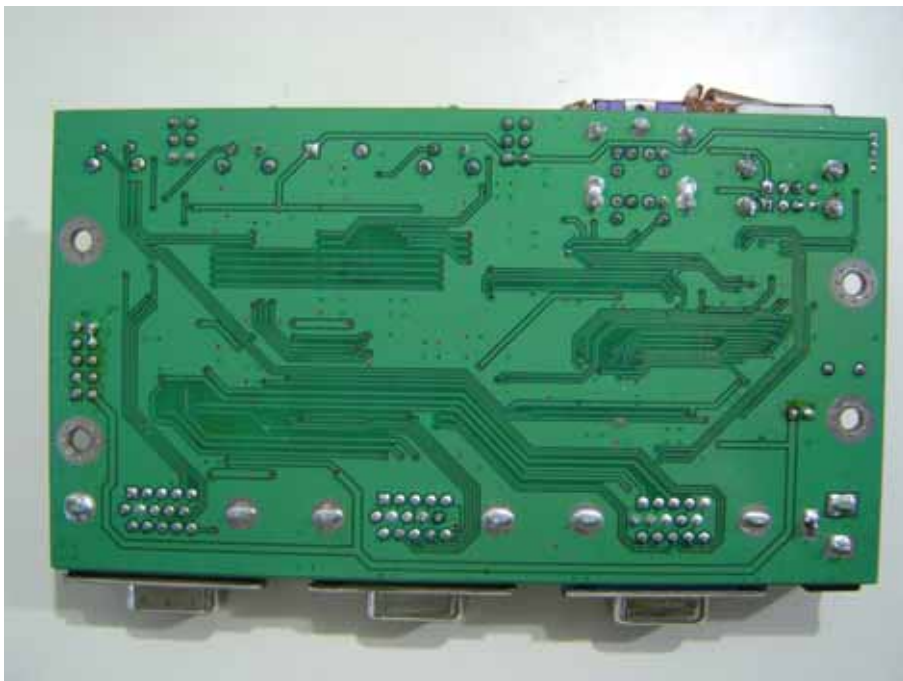
Front view of EUT's PCB 1-1



Rear view of EUT's PCB 1-2



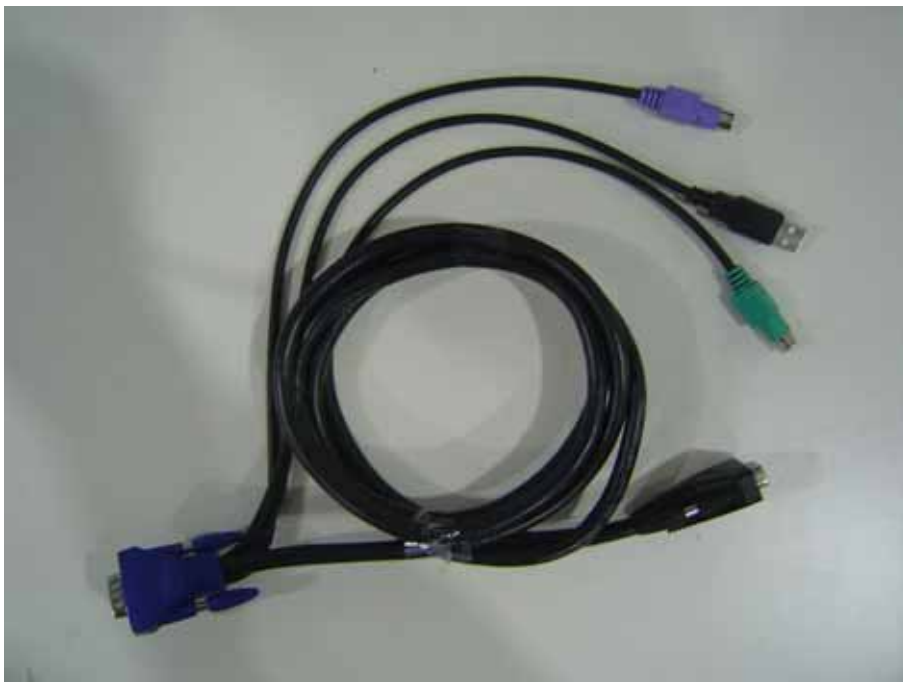
Front view of EUT's PCB 2-1



Rear view of EUT's PCB 2-2



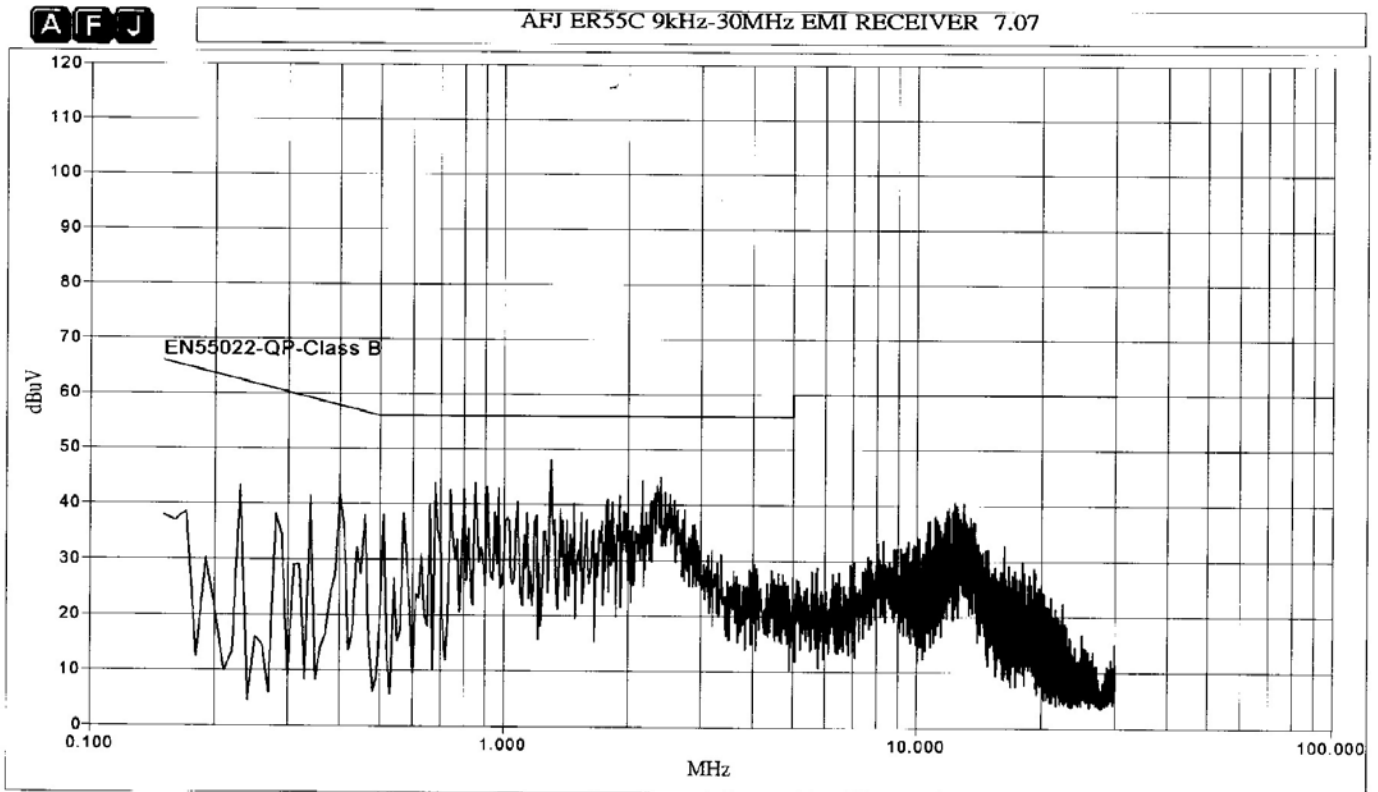
View of EUT's Audio Cable



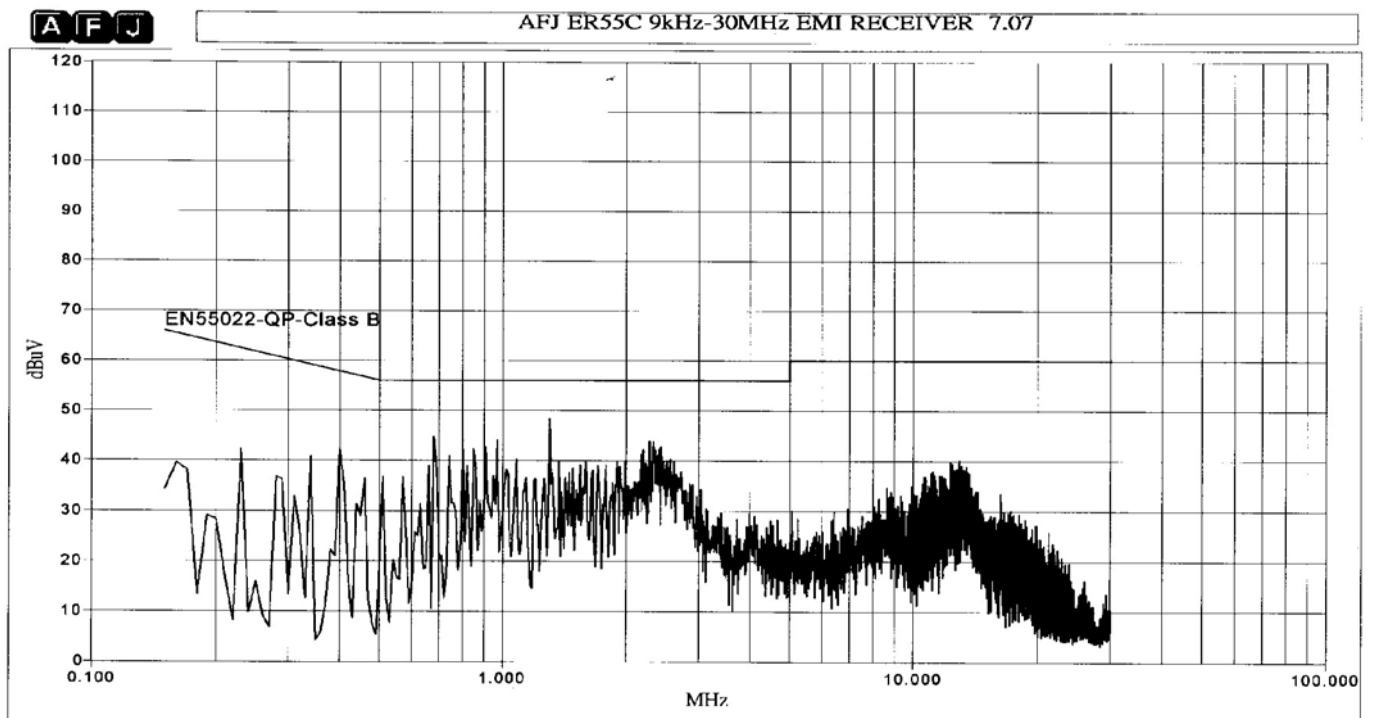
View of EUT's VGA/PS2/USB Cable

# Appendix 1 – Conducted Emission Test Waveform

## A1.1 Mode : Winfcc (1024x768) & Play MP3 mode



Line



Neutral