

# FCC PART 15 CLASS B

## EMI MEASUREMENT AND TEST REPORT

For

**Korea Digital Technology Co., Ltd.**

#825 Unitech Vill Venture Town 1141-2 Beaksuk-Dong, Ilsan-Gu

**FCC ID: TUGKIR090**

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> CCD Camera
<b>Test Engineer:</b> Jerry Wang <i>Jerry</i>	
<b>Report Number:</b> R0511161	
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**TABLE OF CONTENTS**

<b>GENERAL INFORMATION.....</b>	<b>3</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
OBJECTIVE .....	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY .....	3
TEST FACILITY .....	3
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>5</b>
JUSTIFICATION .....	5
EUT EXERCISE SOFTWARE .....	5
SPECIAL ACCESSORIES .....	5
SCHEMATICS / BLOCK DIAGRAM .....	5
EQUIPMENT MODIFICATIONS .....	5
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS .....	6
PRINTED CIRCUIT BOARDS IN EUT .....	6
INTERFACE PORTS AND CABLING.....	6
CONFIGURATION OF TEST SYSTEM .....	7
TEST SETUP BLOCK DIAGRAM .....	7
	7
<b>SUMMARY OF TEST REPORT.....</b>	<b>8</b>
<b>§15.107 - CONDUCTED EMISSIONS .....</b>	<b>9</b>
MEASUREMENT UNCERTAINTY .....	9
EUT SETUP.....	9
RECEIVER SETUP.....	9
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE .....	9
TEST RESULTS SUMMARY .....	10
CONDUCTED EMISSIONS TEST DATA .....	10
PLOTS OF CONDUCTED EMISSION .....	10
<b>§15.109 - RADIATED EMISSIONS.....</b>	<b>11</b>
<b>§15.109 - RADIATED EMISSIONS.....</b>	<b>12</b>
<b>§15.109 - RADIATED EMISSIONS.....</b>	<b>13</b>
MEASUREMENT UNCERTAINTY .....	13
EUT SETUP.....	13
RECEIVER SETUP.....	13
TEST EQUIPMENT LIST AND DETAILS.....	14
TEST PROCEDURE .....	14
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	14
SUMMARY OF TEST RESULTS .....	14
RADIATED EMISSIONS TEST DATA, MEASURE AT 10 METER, AND CONVERT TO 3 METER.....	15

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## GENERAL INFORMATION

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### Product Description for Equipment Under Test (EUT)

The *Korea Digital Technology Co., Ltd.* product, FCC ID: TUGKIR090, model number: *KIR-090*, or the "EUT" as referred to this report, is a CCD Camera, which measures approximately 19.0cmW x 11.0cmL x 11.0cmH.

*\* The test data gathered are from production sample, serial number: KDT0001, provided by the manufacturer.*

### Objective

This Class B report is prepared on behalf of *Korea Digital Technology Co., Ltd.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with U.S.A. FCC Class B and Canada ICES-003 issue 4 limits for conducted and radiated margin requirements for Information Technology Equipment.

### Related Submittal(s)/Grant(s)

No Related Submittals.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp.

### Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules and Article 8 of the VCCI regulations. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations is attached hereinafter and can also be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

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## SYSTEM TEST CONFIGURATION

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### **Justification**

The EUT was tested in accordance with ANSI C63.4-2003.

### **EUT Exercise Software**

The EUT exercising software program was designed to exercise the various installed components in accordance with ANSI C63.4-2003.

### **Special Accessories**

The unit was tested with the normally supplied cabling and accessories provided by the supporting equipment and no special accessories were used.

### **Schematics / Block Diagram**

Exhibit D contains a copy of the EUT's schematics diagram as reference.

### **Equipment Modifications**

No modifications were made to the EUT.

**Local Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number	FCC ID
Dell	Monitor	E153Fpf	CN-0Y4413-72872-557-ORHY	DOC
Hayes	Modem	2400	N/A	DUP6VF- PM2400S A
HP	ThinkJet Printer	2225C	2821S14783	DS16XU2 225
Compaq	PC	SR1103WM	CNC425068M	DOC
Microsoft	USB Mouse	IntelliMouse Explorer	55249-OEM-9926345-4	DOC
IBM	Keyboard		N/A	DOC
Newman	Mouse	MS-010	N/A	DOC

**Power Supply and Line Filters**

Manufacturer	Description	Model	Serial Number	FCC ID
HJC Hua Jung Co.	Power adapter	HASU11FB36	552001300455	DOC

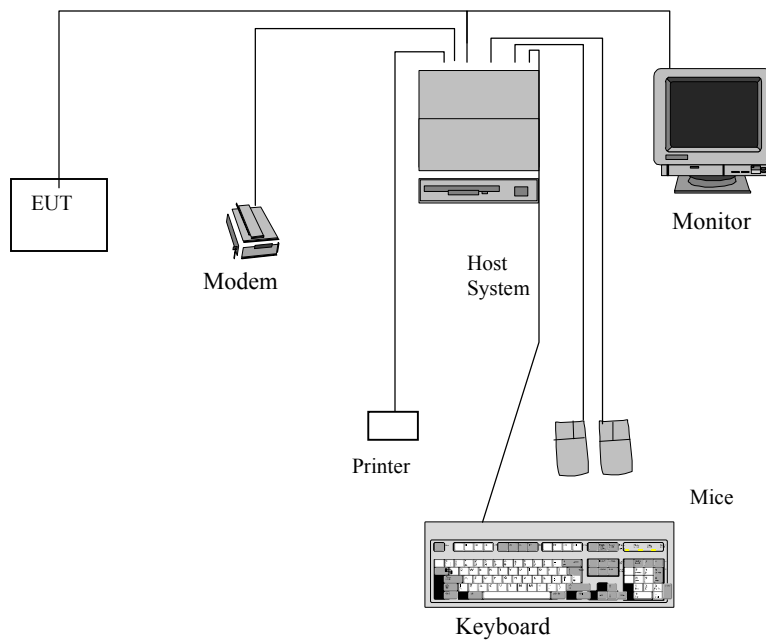
**Printed Circuit Boards in EUT**

Manufacturer/Description	Rev.	# of Layers	Crystals (MHz)
Korea Digital	2	4	14.318

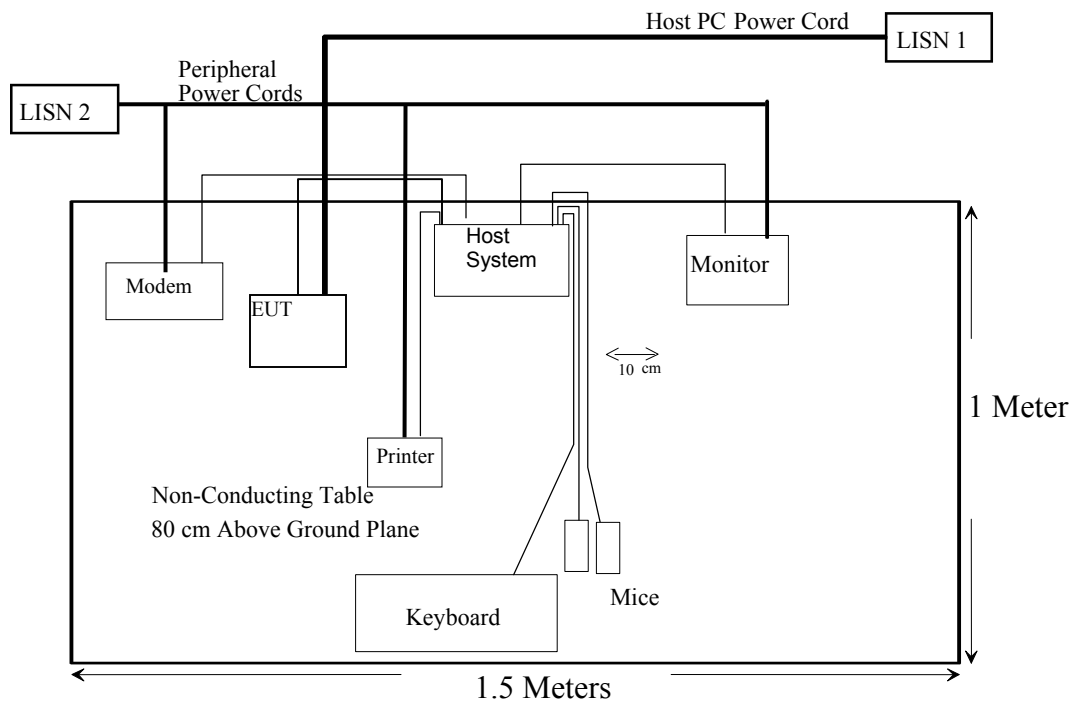
**Interface Ports and Cabling**

Cable Description	Length (M)	From	To
Unshielded cable	1.5	PS2 Port (Compaq PC)	Keyboard
Unshielded cable	1.5	PS2 Port (Compaq PC)	Mouse
Unshielded Serial Cable	1.5	Serial Port (Compaq PC)	Modem
Unshielded Video Cable	1.8	VGA Port(Compaq PC)	Monitor
Unshielded USB Cablex2	1.5	USB Port(Compaq PC)	USB Mouse
Unshielded parallel cable	1.5	Parallel Port(Compaq PC)	HP printer
RCA cable	1.5	Video capturing add on card input on Compaq PC	EUT video output

## Configuration of Test System



## Test Setup Block Diagram



## SUMMARY OF TEST REPORT

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RULE	DESCRIPTION	RESULTS
15.107	Conducted Emissions	Compliant
15.109	Radiated Emissions	Complies
15.19	Labelling Requirements	Compliant
15.21, 15.105	Information to the User	Compliant
15.27	Special Accessories	Compliant



## §15.107 - CONDUCTED EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are receiver, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is  $\pm 2.4$  dB.

### EUT Setup

The measurement was performed in the shielded room, using the same setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC 15 Class B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The adapter was connected to 120Vac/60Hz power source.

### Receiver Setup

The receiver was set to investigate the frequency from 150 kHz to 30MHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Artificial LISN	ESH2-Z5	871884/039	2005-08-16
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2005-09-15
Fluke	Calibrated Voltmeter	189	18485-38	2005-07-18

\* **Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

### Test Procedure

During the conducted emission test, the EUT was connected to the mains outlet of the LISN-1. Maximizing procedure were performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Average readings are distinguished with an "Ave".

## Test Results Summary

According to the recorded data, the EUT complied with the FCC Conducted limits for a Class B device, with the worst margin reading of:

-12.20 dB at 21.5 MHz on the Neutral conductor mode.

## Conducted Emissions Test Data

### Environmental Conditions

Temperature:	24 °C
Relative Humidity:	48%
ATM Pressure:	1021mbar

\*Testing was performed by Jerry Wang on 2005-11-17.

LINE CONDUCTED EMISSIONS				FCC15 CLASS B	
Frequency MHz	Amplitude dB $\mu$ V	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dB $\mu$ V	Margin dB
21.500	37.8	Ave	Neutral	50.00	-12.20
0.440	31.4	Ave	Line	47.06	-15.66
0.170	34.9	Ave	Line	54.96	-20.06
0.440	35.7	QP	Line	57.06	-21.36
0.200	31.3	Ave	Line	53.61	-22.31
0.1550	32.7	Ave	Neutral	55.72	-23.02
21.500	36.8	QP	Neutral	60.00	-23.20
0.155	41.1	QP	Neutral	65.72	-24.62
0.170	40.0	QP	Line	64.96	-24.96
0.180	38.9	QP	Neutral	64.48	-25.58
0.180	27.1	Ave	Neutral	54.48	-27.38
0.200	36.1	QP	Line	63.61	-27.51

## Plots of Conducted Emission

The plots of conducted emission are presented hereinafter as reference.

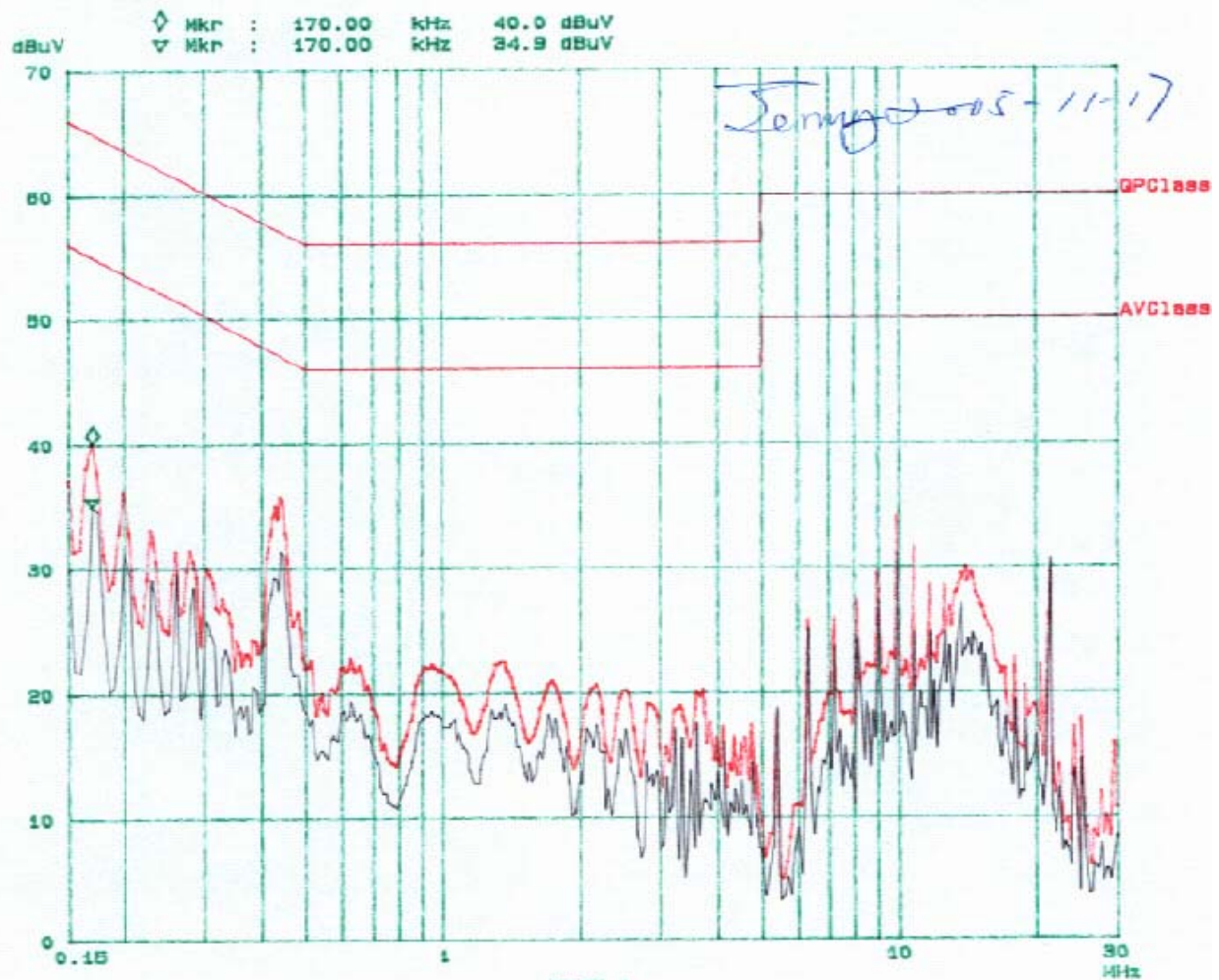
Bay Area Compliance Laboratory Corp  
Class B

17. Nov 05 16:32

EUT: KIR-090  
Manuf: Korea Digital  
Op Cond: Normal  
Operator: Jenny  
Comment: L  
120VAC

## Scan Settings (3 Ranges)

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dB LN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dB LN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dB LN	OFF



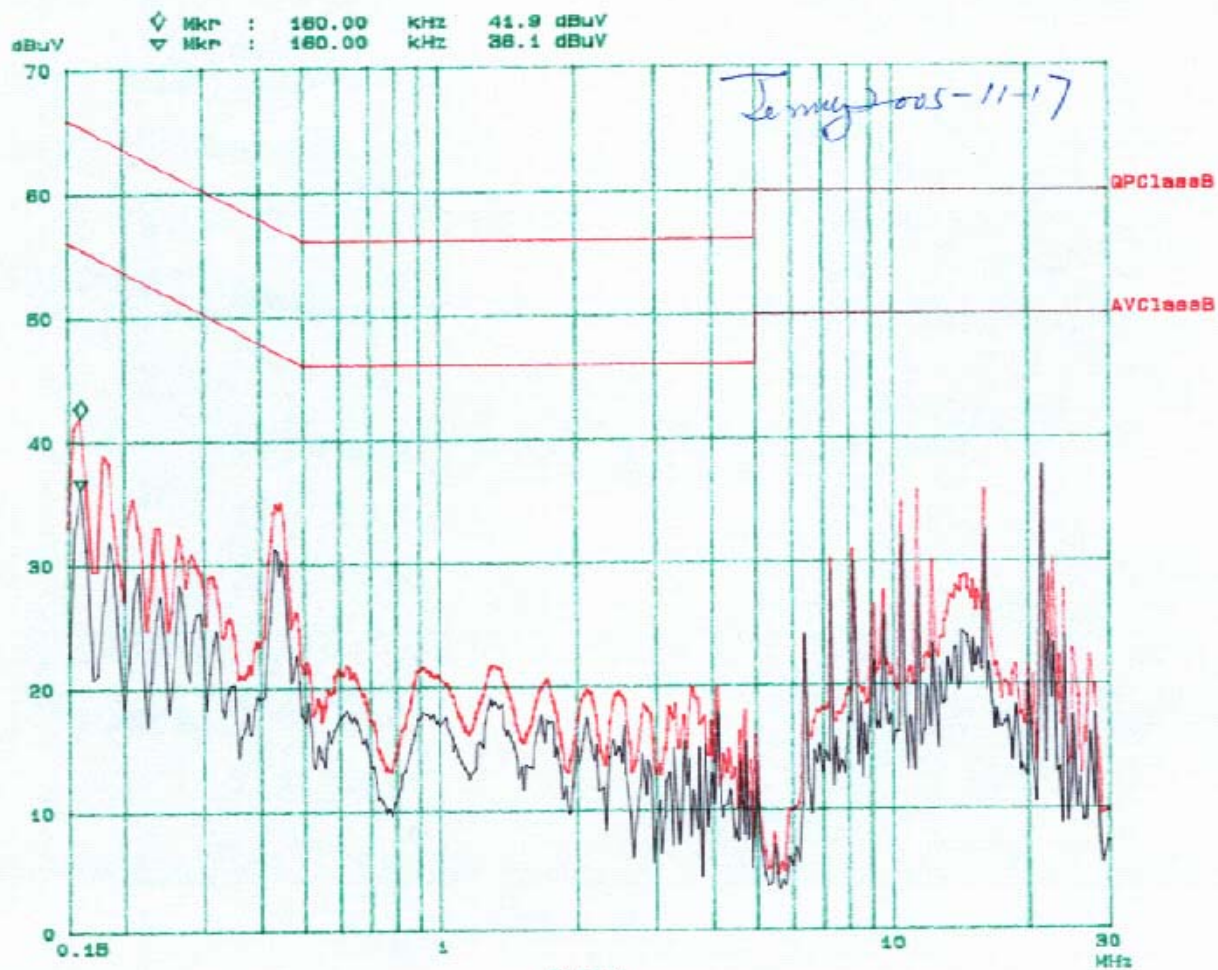
Bay Area Compliance Laboratory Corp  
Class B

17. Nov 05 17:12

EUT: KIR-090  
Manuf: Korea Digital  
Op Cond: Normal  
Operator: Jerry  
Comment: N  
120VAC

## Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dB	OFF
1M	5M	10k	9k	QP+AV	1ms	15dB	OFF
5M	30M	100k	9k	QP+AV	1ms	15dB	OFF



## §15.109 - RADIATED EMISSIONS

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### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are receiver, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is  $\pm 4.0$  dB.

### EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4-2003. The specification used was the FCC15B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The adapter was connected to 120Vac/60Hz power source.

### Receiver Setup

The system was tested to 1000 MHz.

During the radiated emission test, the receiver was set with the following configurations:

<b><i>Frequency Range</i></b>	<b><i>RBW</i></b>	<b><i>Video B/W</i></b>
Below 30MHz	10kHz	10kHz
30 – 1000MHz	100kHz	100kHz
Above 1000MHz	1MHz	1MHz



## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal Date
Sunol Sciences	Antenna	JB1	A013105-3	2005-2-11
Sunol Sciences	System Controller	SC99V	122303-1	N/R
Agilent	Amplifier, Pre	8447D	2944A10187	2005-8-20
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100044	2005-09-29

\* **Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

## Test Procedure

For the radiated emissions test, the EUT all support equipment were connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions in the described configurations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a "Qp" in the data table.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor, and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

## Summary of Test Results

According to the following table, the EUT complied with the FCC Class B standards and these test results is deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, and had the worst margin of:

**-7.7 dB at 450.0 MHz** in the **Horizontal** polarization , 30 to 1000 MHz

**Radiated Emissions Test Data, Measure at 10 Meter, and convert to 3 Meter****Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	45%
ATM Pressure:	1016mbar

*\*Testing was performed by Jerry Wang on 2005-11-17.*

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Distance Factor	Correction Factor	15B	15B
MHz	dBuV/m	Degree	Meter	H / V	dB	dB	dB	dB	dBuV/m	Limit	Margin
450.0	35.2	280	3.0	H	16.9	4.6	28.4	10	38.30	46.0	-7.7
372.2	35.1	200	1.2	V	15.5	4.1	27.9	10	36.80	46.0	-9.2
343.3	36.2	120	1.2	V	14.0	4.0	27.7	10	36.50	46.0	-9.5
352.8	35.2	180	1.2	V	14.5	4.2	27.7	10	36.20	46.0	-9.8
343.2	35.8	300	2.5	H	14.0	4.0	27.7	10	36.10	46.0	-9.9
125.0	34.9	120	1.2	V	14.1	2.3	28.2	10	33.10	43.5	-10.4
143.1	35.3	200	3.0	H	13.3	2.4	28.1	10	32.90	43.5	-10.6
144.0	35.2	200	1.2	V	13.3	2.4	28.1	10	32.80	43.5	-10.7
125.0	34.3	300	2.5	H	14.1	2.3	28.2	10	32.50	43.5	-11
144.0	34.78	180	2.5	H	13.3	2.4	28.1	10	32.38	43.5	-11.12
143.1	34.2	120	1.2	V	13.3	2.4	28.1	10	31.80	43.5	-11.7
300.0	34.3	190	3.0	H	13.6	3.6	27.4	10	34.10	46.0	-11.9
286.2	33.9	200	3.0	H	13.6	3.6	27.4	10	33.70	46.0	-12.3
286.2	33.9	100	1.2	V	13.6	3.6	27.4	10	33.70	46.0	-12.3
50.1	36.3	120	3.0	H	8.3	1.6	28.5	10	27.70	40.0	-12.3
50.2	35.2	190	1.2	V	8.3	1.6	28.5	10	26.60	40.0	-13.4
150.0	32.8	200	1.2	V	12.6	2.5	28.0	10	29.90	43.5	-13.6