

FCC PART 15 CLASS B

EMI MEASUREMENT AND TEST REPORT

For

Human Advanced Co., Ltd

3Fl., Poi Bldg., #229-3, Poi-Dong, Kangnam-Gu, Seoul, Korea 135-964

FCC ID: TUHOMC1006

This Report Concerns: ☒ Original Report	Equipment Type: STB controller
Test Engineer: Oscar Au 	
Report Number: R0511162	
Report Date: 2005-12-6	
Reviewed By:  Snell Leong	
Prepared By: Bay Area Compliance Laboratory Corporation 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732-9164	

Note: The test report is specially limited to the use of the above client company and this particular sample only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
TEST FACILITY	3
SYSTEM TEST CONFIGURATION.....	5
JUSTIFICATION	5
EUT EXERCISE SOFTWARE	5
SPECIAL ACCESSORIES	5
SCHEMATICS / BLOCK DIAGRAM	5
EQUIPMENT MODIFICATIONS	5
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS	5
INTERFACE PORTS AND CABLING.....	6
CONFIGURATION OF TEST SYSTEM	7
TEST SETUP BLOCK DIAGRAM.....	7
SUMMARY OF TEST REPORT.....	8
§15.107 - CONDUCTED EMISSIONS	9
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
§15.109 - RADIATED EMISSIONS.....	13
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
*THE TEST DATA WAS WITHIN THE MEASUREMENT OF UNCERTAINTY	14
RADIATED EMISSIONS TEST DATA, MEASURED AT 3 METER.....	15

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Human Advanced Co., Ltd* product, FCC ID: *TUHOMC1006*, model number: *OMC1006*, or the "EUT" as referred to this report, is a *STB controller*, which measures approximately 27.5 cm W x 44.0 cm L x 9.0 cm H.

** The test data gathered are from production sample, serial number: HUAD0001, provided by the manufacturer.*

Objective

This Class B report is prepared on behalf of Human Advanced 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>

SYSTEM TEST CONFIGURATION

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
Toshiba	TV	14AF41	20448785A	N/A
Compaq	Laptop	Presario2100	N/A	DOC
Human Advanced	STB	OMC1007	N/A	TUHOM C1007

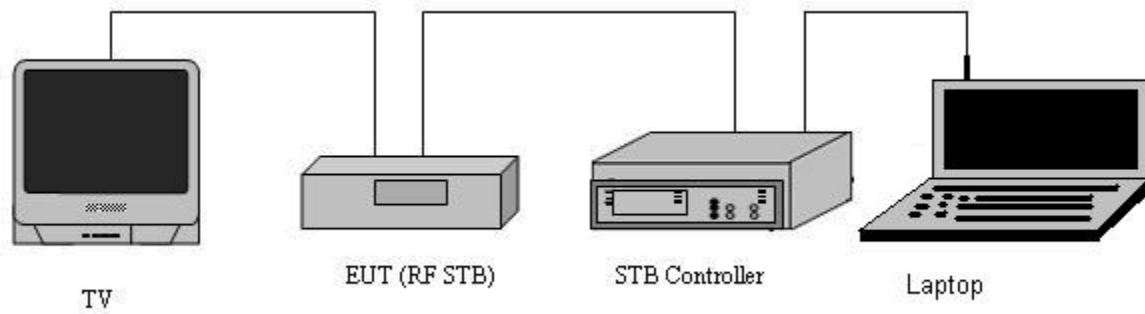
Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number	FCC ID
Tae Young Electronics Co., Ltd	AC Power Adaptor	GRA1215	N/A	N/A

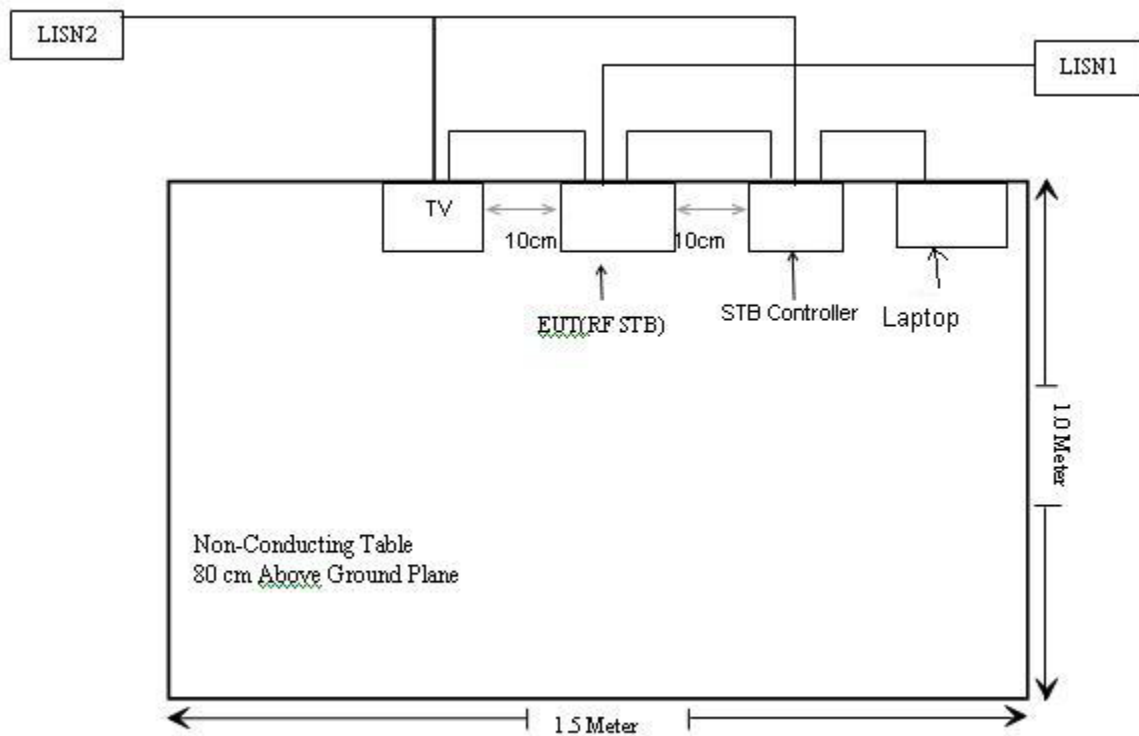
Interface Ports and Cabling

Cable Description	Length (M)	From	To
Coaxial cable	2	STB controller	RF STB
Coaxial cable	3	RF STB	TV
Serial cable	2	Laptop	STB controller

Configuration of Test System



Test Setup Block Diagram



SUMMARY OF TEST REPORT

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

*: Test data are within the measurement uncertainty.

§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 +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 EUT 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 was 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:

-3.4 dB at 0.205MHz on the Neutral conductor mode.

**The test data was within the measurement of uncertainty.*

Conducted Emissions Test Data

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	37%
ATM Pressure:	1009mbar

**Testing was performed by Oscar Au on 2005-11-18.*

Line Conducted Emissions				FCC15 Class B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
0.205	50.0	Ave	Neutral	53.41	-3.4*
0.150	50.1	Ave	Neutral	56.00	-5.9
0.150	49.6	Ave	Line	56.00	-6.4
0.205	46.3	Ave	Line	53.41	-7.1
4.680	48.6	QP	Neutral	56.00	-7.4
4.580	48.5	QP	Line	56.00	-7.5
0.150	57.4	QP	Neutral	66.00	-8.6
0.150	57.1	QP	Line	66.00	-8.9
0.205	53.2	QP	Neutral	63.41	-10.2
0.205	50.9	QP	Line	63.41	-12.5
4.580	26.8	Ave	Line	46.00	-19.2
4.750	10.4	Ave	Neutral	46.00	-35.6

**The test data was within the measurement of uncertainty.*

Plots of Conducted Emission

The plots of conducted emission are presented hereinafter as reference.

Bay Area Compliance Laboratory Corp
Class B

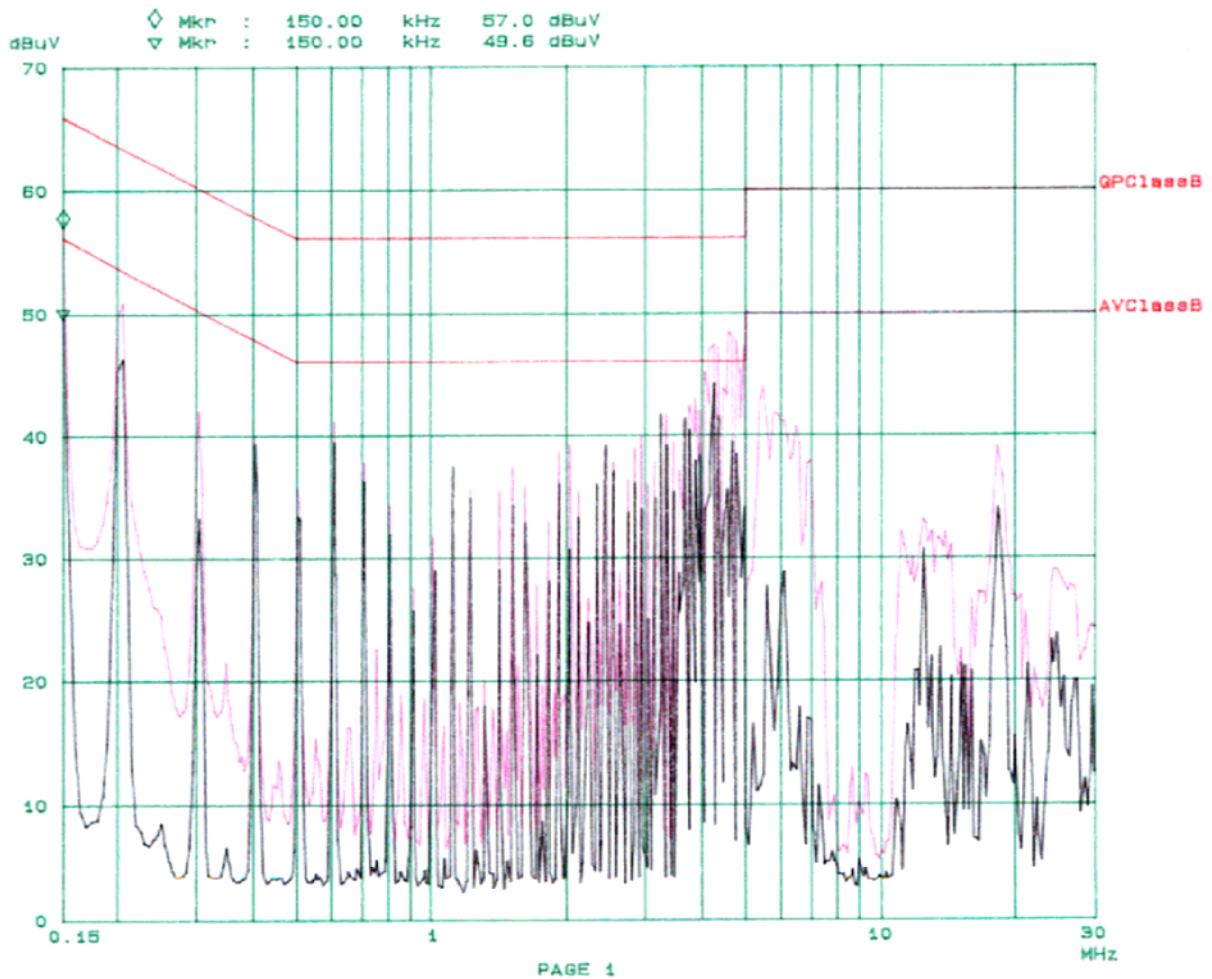
18. Nov 05 17:05

EUT: OMC1006
Manuf: Human Advanced Co., Ltd
Op Cond: Normal
Operator: Oscar
Comment: L
120VAC

[Handwritten signature]
11/18/05

Scan Settings (3 Ranges)

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



Bay Area Compliance Laboratory Corp
Class B

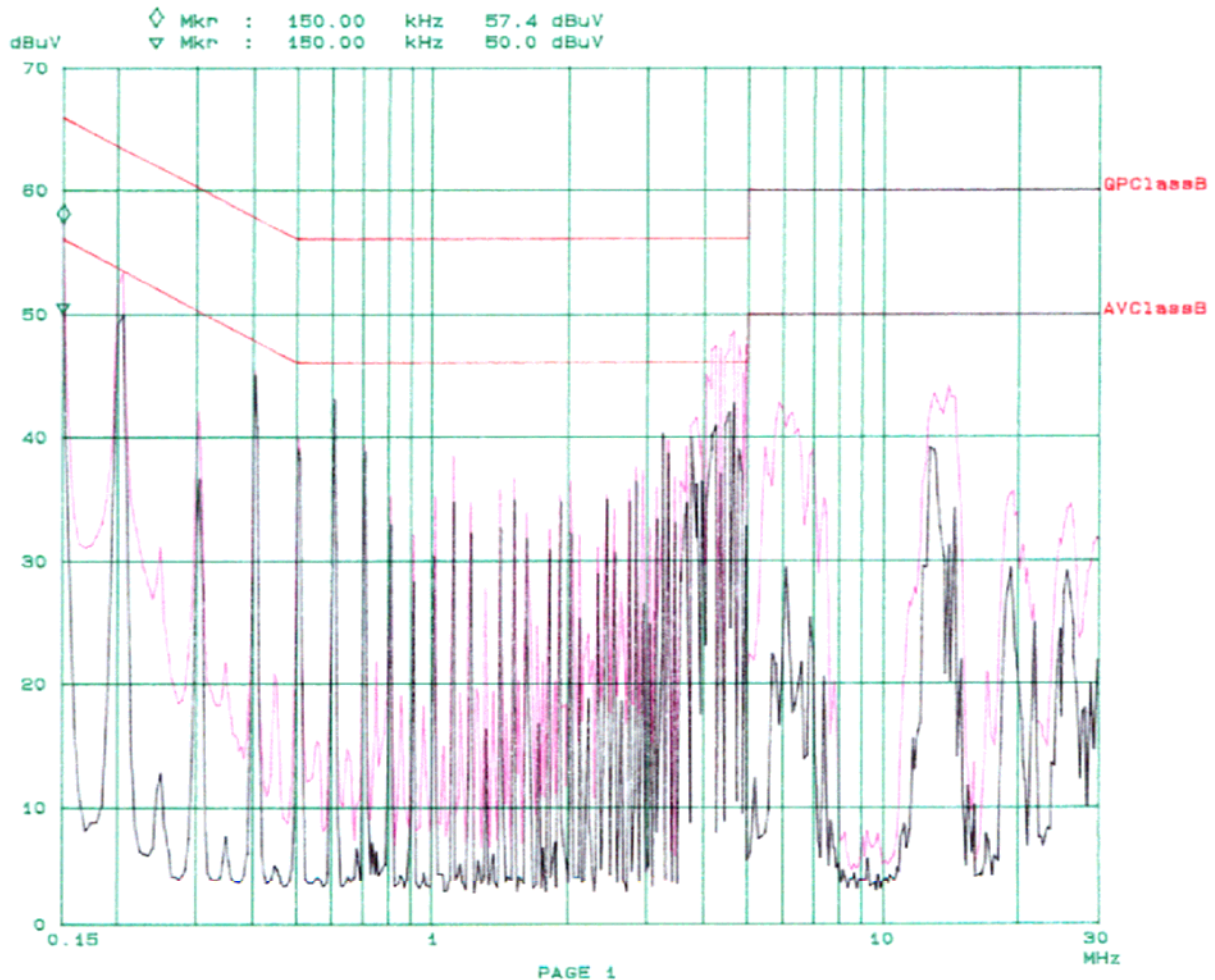
18. Nov 05 16:29

EUT: OMC1006
Manuf: Human Advanced Co., Ltd
Op Cond: Normal
Operator: Oscar
Comment: N
120VAC


11/18/05

Scan Settings (3 Ranges)

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



§15.109 - RADIATED EMISSIONS

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 +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 EUT 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:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
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	2005-9-29

* **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:

-3.6 dB at 55.00/519.83 MHz in the Horizontal polarization , 30 to 1000 MHz*

**The test data was within the measurement of uncertainty*

Radiated Emissions Test Data, measured at 3 meter**Environmental Conditions**

Temperature:	23°C
Relative Humidity:	36%
ATM Pressure:	1010mbar

**Testing was performed by Oscar Au on 2005-11-18.*

Frequency MHz	Reading dBuV	Direction Degree	Height Meter	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Factor dBuV	FCC 15B	
									Limit	Margin
55.00	56.0	160	1.0	H	7.3	1.6	28.5	36.4	40	-3.6*
519.83	47.8	180	2.8	H	18.1	5.0	28.5	42.4	46	-3.6*
564.08	45.6	180	1.5	H	18.4	5.1	28.7	40.4	46	-5.6
74.00	52.7	180	1.5	V	8.1	1.8	28.4	34.2	40	-5.8
519.83	45.4	100	1.8	V	18.1	5.0	28.5	40.0	46	-6.0
530.89	43.5	180	1.5	H	18.6	5.0	28.5	38.6	46	-7.4
541.95	43.1	190	1.1	H	18.8	5.2	28.5	38.6	46	-7.4
586.20	43.3	180	1.3	H	18.8	5.3	28.8	38.6	46	-7.4
508.77	43.5	220	1.5	V	17.8	4.9	28.5	37.7	46	-8.3
564.08	42.9	90	1.5	V	18.4	5.1	28.7	37.7	46	-8.3
575.13	42.1	200	1.5	V	18.8	5.2	28.7	37.4	46	-8.6
508.77	43.1	180	2.0	H	17.8	4.9	28.5	37.3	46	-8.7
575.13	41.5	180	2.8	H	18.8	5.2	28.7	36.8	46	-9.2
586.20	41.2	200	1.5	V	18.8	5.3	28.8	36.5	46	-9.5
597.25	40.3	200	1.5	V	19.4	5.4	28.6	36.5	46	-9.5
107.98	48.4	250	1.0	V	11.0	2.1	28.2	33.3	43.5	-10.2
530.89	40.3	90	1.5	V	18.6	5.0	28.5	35.4	46	-10.6
541.95	39.8	30	1.8	V	18.8	5.2	28.5	35.3	46	-10.7
192.03	45.9	230	1.5	V	11.5	2.9	27.7	32.6	43.5	-10.9
192.03	45.8	200	2.5	H	11.5	2.9	27.7	32.5	43.5	-11.0
597.25	38.5	200	2.0	H	19.4	5.4	28.6	34.7	46	-11.3
74.00	46.5	160	2.5	H	8.1	1.8	28.4	28.0	40	-12.0
107.98	45.2	280	2.8	H	11.0	2.1	28.2	30.1	43.5	-13.4
55.00	45.0	180	2.5	V	7.3	1.6	28.5	25.4	40	-14.6

**The test data was within the measurement of uncertainty.*