

# FCC PART 15 CLASS B

## EMI MEASUREMENT AND TEST REPORT

For

**Human Advanced Co., Ltd**

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**FCC ID: TUHOMC1007**

|                                                                                                                                                              |                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>This Report Concerns:</b><br><input checked="" type="checkbox"/> Original Report                                                                          | <b>Equipment Type:</b><br>RF STB |
| <b>Test Engineer:</b> Oscar Au                                             |                                  |
| <b>Report Number:</b> R0511162                                                                                                                               |                                  |
| <b>Report Date:</b> 2005-12-6                                                                                                                                |                                  |
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**TABLE OF CONTENTS**

|                                                                                          |           |
|------------------------------------------------------------------------------------------|-----------|
| <b>GENERAL INFORMATION.....</b>                                                          | <b>4</b>  |
| PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....                                 | 4         |
| OBJECTIVE .....                                                                          | 4         |
| RELATED SUBMITTAL(S)/GRANT(S).....                                                       | 4         |
| TEST METHODOLOGY .....                                                                   | 4         |
| TEST FACILITY .....                                                                      | 4         |
| <b>SYSTEM TEST CONFIGURATION.....</b>                                                    | <b>6</b>  |
| JUSTIFICATION .....                                                                      | 6         |
| EUT EXERCISE SOFTWARE .....                                                              | 6         |
| SPECIAL ACCESSORIES .....                                                                | 6         |
| SCHEMATICS / BLOCK DIAGRAM .....                                                         | 6         |
| EQUIPMENT MODIFICATIONS .....                                                            | 6         |
| LOCAL SUPPORT EQUIPMENT LIST AND DETAILS .....                                           | 6         |
| INTERFACE PORTS AND CABLING.....                                                         | 7         |
| CONFIGURATION OF TEST SYSTEM .....                                                       | 8         |
| TEST SETUP BLOCK DIAGRAM.....                                                            | 8         |
| <b>SUMMARY OF TEST REPORT.....</b>                                                       | <b>9</b>  |
| <b>§15.107 - CONDUCTED EMISSIONS .....</b>                                               | <b>10</b> |
| MEASUREMENT UNCERTAINTY .....                                                            | 10        |
| EUT SETUP.....                                                                           | 10        |
| RECEIVER SETUP.....                                                                      | 10        |
| TEST EQUIPMENT LIST AND DETAILS.....                                                     | 10        |
| TEST PROCEDURE .....                                                                     | 10        |
| TEST RESULTS SUMMARY .....                                                               | 11        |
| CONDUCTED EMISSIONS TEST DATA .....                                                      | 11        |
| PLOTS OF CONDUCTED EMISSION .....                                                        | 11        |
| <b>§15.109 - RADIATED EMISSIONS.....</b>                                                 | <b>14</b> |
| MEASUREMENT UNCERTAINTY .....                                                            | 14        |
| EUT SETUP.....                                                                           | 14        |
| RECEIVER SETUP.....                                                                      | 14        |
| TEST EQUIPMENT LIST AND DETAILS.....                                                     | 15        |
| TEST PROCEDURE .....                                                                     | 15        |
| CORRECTED AMPLITUDE & MARGIN CALCULATION .....                                           | 15        |
| SUMMARY OF TEST RESULTS .....                                                            | 15        |
| RADIATED EMISSIONS TEST DATA, MEASURED AT 3 METER.....                                   | 16        |
| <b>§15.111 – ANTENNA POWER CONDUCTION MEASUREMENT .....</b>                              | <b>17</b> |
| EUT SETUP.....                                                                           | 17        |
| RECEIVER SETUP.....                                                                      | 17        |
| TEST EQUIPMENT LIST AND DETAILS.....                                                     | 18        |
| TEST PROCEDURE .....                                                                     | 18        |
| CORRECTED AMPLITUDE & MARGIN CALCULATION .....                                           | 18        |
| SUMMARY OF TEST RESULTS .....                                                            | 18        |
| <b>§15.115(B)(1)(II) – OUTPUT SIGNAL LEVEL MEASUREMENT .....</b>                         | <b>20</b> |
| EUT SETUP.....                                                                           | 20        |
| RECEIVER SETUP.....                                                                      | 20        |
| TEST EQUIPMENT LIST AND DETAILS.....                                                     | 21        |
| TEST PROCEDURE .....                                                                     | 21        |
| CORRECTED AMPLITUDE & MARGIN CALCULATION .....                                           | 21        |
| SUMMARY OF TEST RESULTS .....                                                            | 21        |
| <b>§15.115(B)(2)(II) – OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSION MEASUREMENT .....</b> | <b>23</b> |
| EUT SETUP.....                                                                           | 23        |
| RECEIVER SETUP.....                                                                      | 23        |

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|                                                                      |           |
|----------------------------------------------------------------------|-----------|
| TEST EQUIPMENT LIST AND DETAILS .....                                | 24        |
| TEST PROCEDURE .....                                                 | 24        |
| CORRECTED AMPLITUDE & MARGIN CALCULATION .....                       | 24        |
| SUMMARY OF TEST RESULTS .....                                        | 24        |
| <b>§15.115(C)(1)(II) – ANTENNA TRANSFER SWITCH MEASUREMENT .....</b> | <b>26</b> |
| EUT SETUP .....                                                      | 26        |
| RECEIVER SETUP .....                                                 | 26        |
| TEST EQUIPMENT LIST AND DETAILS .....                                | 27        |
| TEST PROCEDURE .....                                                 | 27        |
| CORRECTED AMPLITUDE & MARGIN CALCULATION .....                       | 27        |
| SUMMARY OF TEST RESULTS .....                                        | 27        |

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## GENERAL INFORMATION

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

The *Human Advanced Co., Ltd* product, FCC ID: *TUHOMC1007*, model number: OMC1007, or the "EUT" as referred to this report, is a *RF STB*, which measures approximately 16.5 cm W x 21.5 cm L x 5.0 cm H.

*\* The test data gathered are from production sample, serial number: HUAD0002, 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    |
| Leader Instruments | NTSC pattern generator | LCG-400 | 2050017       | N/A    |
| Human Advanced     | STB Controller         | OMC1006 |               |        |

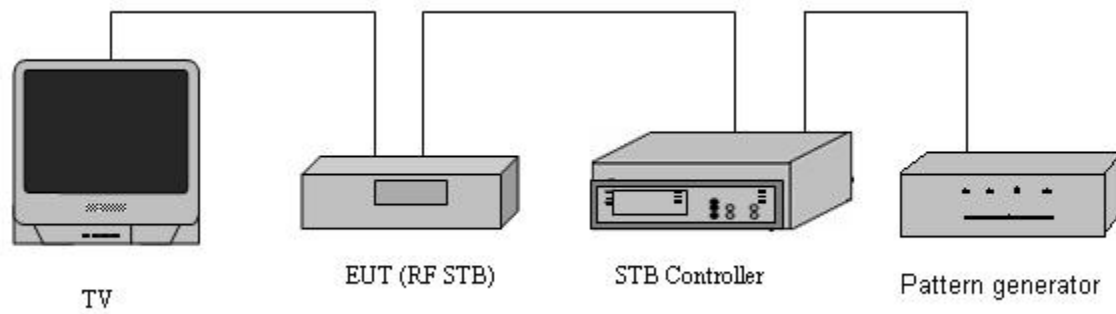
### Power Supply and Line Filters

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

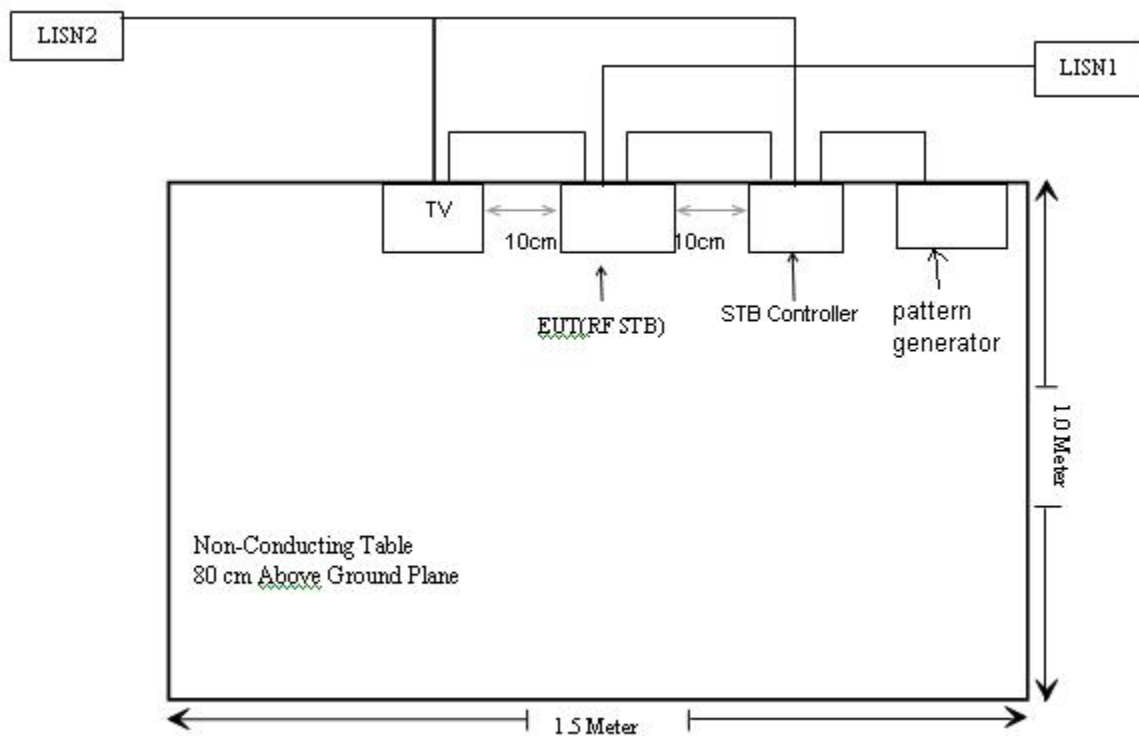
**Interface Ports and Cabling**

| <b>Cable Description</b> | <b>Length (M)</b> | <b>From</b>       | <b>To</b>      |
|--------------------------|-------------------|-------------------|----------------|
| Coaxial cable            | 2                 | STB controller    | RF STB         |
| Coaxial cable            | 3                 | RF STB            | TV             |
| Coaxial cable            | 1.5               | Pattern generator | STB controller |

## Configuration of Test System



## Test Setup Block Diagram



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**SUMMARY OF TEST REPORT**

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| RULE             | DESCRIPTION                                             | RESULTS   |
|------------------|---------------------------------------------------------|-----------|
| 15.107           | Conducted Emissions                                     | Compliant |
| 15.109           | Radiated Emissions                                      | Complies* |
| 15.111           | Antenna Power Conduction Measurement                    | Compliant |
| 15.115(b)(1)(ii) | Output Signal Level Measurement                         | Compliant |
| 15.115(b)(2)(ii) | Output Terminal Conducted Spurious Emission Measurement | Compliant |
| 15.115(c)(1)(ii) | Transfer Switch Measurement                             | Compliant |
| 15.19            | Labelling Requirements                                  | Compliant |
| 15.21, 15.105    | Information to the User                                 | Compliant |
| 15.27            | Special Accessories                                     | Compliant |

\*: Test data was 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:

**-10.8 dB at 0.150MHz on the Neutral conductor mode.**

## 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<br>MHz         | Amplitude<br>dBμV | Detector<br>Qp/Ave/Peak | Phase<br>Line/Neutral | Limit<br>dBμV | Margin<br>dB |
| 0.150                    | 45.2              | Ave                     | Neutral               | 56.00         | -10.8        |
| 0.150                    | 44.3              | Ave                     | Line                  | 56.00         | -11.7        |
| 17.200                   | 43.5              | QP                      | Neutral               | 60.00         | -16.5        |
| 0.150                    | 47.1              | QP                      | Neutral               | 66.00         | -18.9        |
| 0.150                    | 46.5              | QP                      | Line                  | 66.00         | -19.5        |
| 12.500                   | 25.3              | Ave                     | Line                  | 50.00         | -24.7        |
| 13.600                   | 23.6              | Ave                     | Neutral               | 50.00         | -26.4        |
| 17.200                   | 32.7              | QP                      | Line                  | 60.00         | -27.3        |
| 12.500                   | 28.1              | QP                      | Line                  | 60.00         | -31.9        |
| 17.200                   | 16.3              | Ave                     | Line                  | 50.00         | -33.7        |
| 17.200                   | 13.0              | Ave                     | Neutral               | 50.00         | -37.0        |
| 13.600                   | 22.6              | QP                      | Neutral               | 60.00         | -37.4        |

## Plots of Conducted Emission

The plots of conducted emission are presented hereinafter as reference.

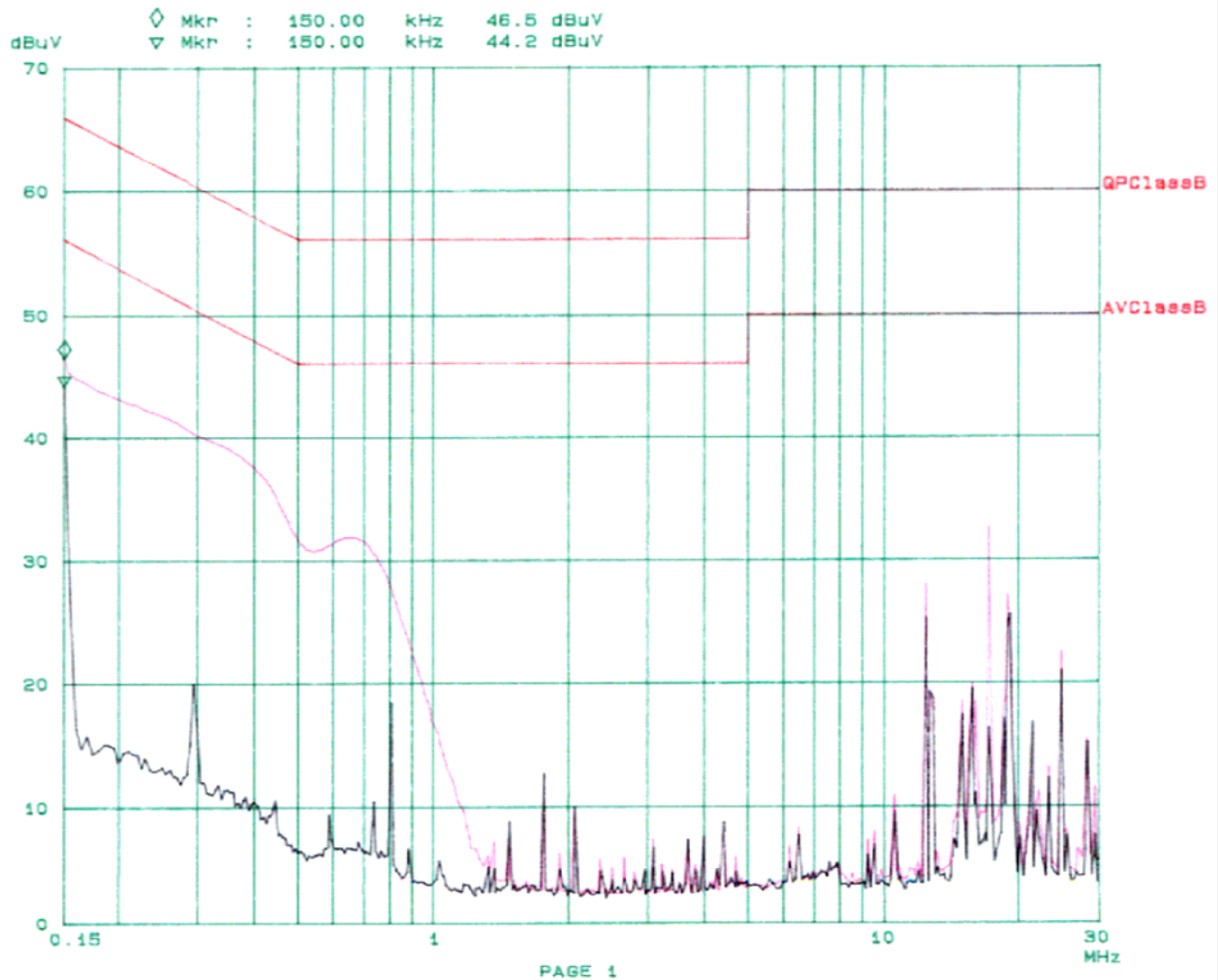
Bay Area Compliance Laboratory Corp  
Class B

18. Nov 05 16:02

EUT: OMC1007  
Manuf: Human Advanced Co., Ltd  
Op Cond: Normal  
Operator: Oscar  
Comment: L  
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   | 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

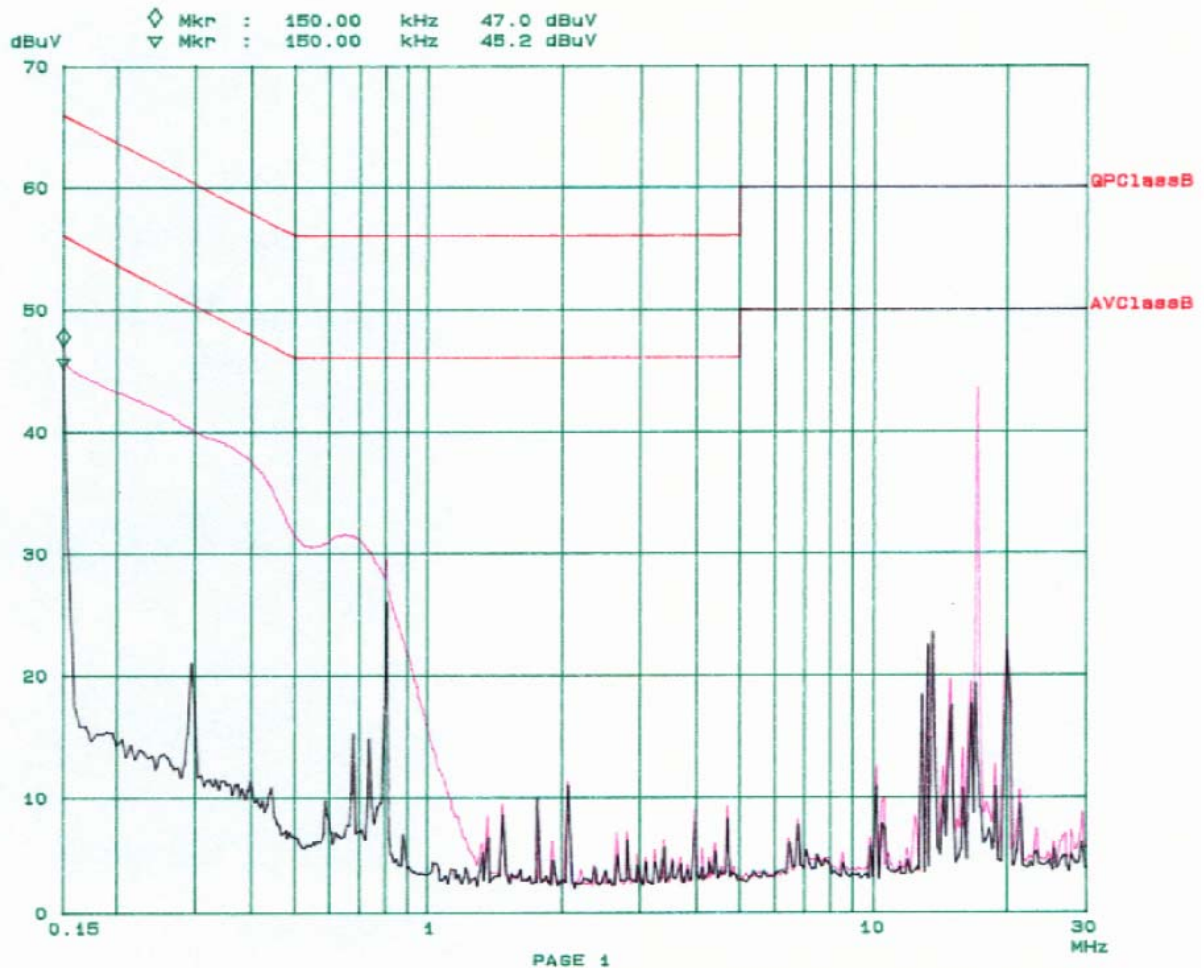
16. Nov 05 15:39

EUT: OMC1007  
Manuf: Human Advanced Co., Ltd  
Op Cond: Normal  
Operator: Oscar  
Comment: N  
120VAC

*WA**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    |



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## §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 +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:

| <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<br>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<br>MHz | Reading<br>dBuV | Direction<br>Degree | Height<br>Meter | Polar<br>H / V | Antenna<br>Loss<br>dB | Cable loss<br>dB | Amplifier<br>dB | Correction<br>Factor<br>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.

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## §15.111 – Antenna Power Conduction Measurement

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### 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 system was tested to 2000 MHz.

During the 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    |
|-------------------|---------------------------|---------|---------------|-------------|
| Leader Instrument | NTSC pattern generator    | LCG-400 | 2050017       | N/R         |
| HP                | Spectrum analyzer         | 8566B   | 2332A02816    | 10-Nov-2004 |
| HP                | Spectrum analyzer display | 85662A  | 3026A20081    | 10-Nov-2004 |
| HP                | Quasi-Peak adaptor        | 85650A  | 3107A01505    | 10-Nov-2004 |
| Inmet             | Matching Pad              | 9079    | N/A           | N/R         |
| HP                | Pre-amplifier             | 8447D   | 2944A06639    | 15-Aug-2005 |
| HP                | Pre-amplifier             | 8447D   | 2944A06639    | 15-Aug-2005 |

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

## Test Procedure

The RF input terminal was connected to the test receiver through the matching pad (75-50 ohm) with pre-amplifier connected. RF output was measured under the EUT operating mode. Result is displayed on the spectrum analyzer.

## 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:

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

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:

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

The limit is 2.0 nanowatts in the frequency range from 30MHz to 5000MHz.

## 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:

**-8.4 dB at 601 MHz**

**Environmental Conditions**

|                    |          |
|--------------------|----------|
| Temperature:       | 15 °C    |
| Relative Humidity: | 40%      |
| ATM Pressure:      | 1010mbar |

Testing was performed by Oscar Au on 2005-11-19.

**CH.3**

| Frequency | Reading | Amplifier | Cable loss | Matching loss | Correction factor | limit | Margin |
|-----------|---------|-----------|------------|---------------|-------------------|-------|--------|
| MHz       | dBuV    | dB        | dB         | dB            | dBuV              | dBuV  | dB     |
| 601       | 63.7    | 28.6      | 0.8        | 5.7           | 41.6              | 50    | -8.4   |
| 1945.1    | 66.9    | 35.4      | 1.9        | 5.7           | 39.1              | 50    | -10.9  |
| 871.9     | 56.5    | 27.7      | 1.0        | 5.7           | 35.5              | 50    | -14.5  |
| 671.6     | 55.8    | 28.5      | 0.8        | 5.7           | 33.8              | 50    | -16.2  |
| 1493      | 51.1    | 34.9      | 1.3        | 5.7           | 23.2              | 50    | -26.8  |
| 1115.8    | 41      | 26.5      | 1.3        | 5.7           | 21.5              | 50    | -28.5  |

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## §15.115(b)(1)(ii) – Output signal level measurement

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### 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 system was tested to 2000 MHz.

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

| <i><b><u>Frequency Range</u></b></i> | <i><b><u>RBW</u></b></i> | <i><b><u>Video B/W</u></b></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    |
|-------------------|---------------------------|---------|---------------|-------------|
| Leader Instrument | NTSC pattern generator    | LCG-400 | 2050017       | N/R         |
| HP                | Spectrum analyzer         | 8566B   | 2332A02816    | 10-Nov-2004 |
| HP                | Spectrum analyzer display | 85662A  | 3026A20081    | 10-Nov-2004 |
| HP                | Quasi-Peak adaptor        | 85650A  | 3107A01505    | 10-Nov-2004 |
| Inmet             | Matching Pad              | 9079    | N/A           | N/R         |
| HP                | Pre-amplifier             | 8447D   | 2944A06639    | 15-Aug-2005 |
| HP                | Pre-amplifier             | 8447D   | 2944A06639    | 15-Aug-2005 |

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

## Test Procedure

The RF output terminal was connected to the test receiver through the matching pad (75-50 ohm) with pre-amplifier connected. RF output was measured under the EUT operating mode. Result is displayed on the spectrum analyzer. Leader generate bar pattern onto the EUT. Spectrum was checked in each test mode and operation mode, and the maximum measured data were reported.

## 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:

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

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:

**-7.2 dB** at 67.214 MHz at channel 4

**Environmental Conditions**

|                    |          |
|--------------------|----------|
| Temperature:       | 15 °C    |
| Relative Humidity: | 40%      |
| ATM Pressure:      | 1010mbar |

*\*Testing was performed by Oscar Au on 2005-11-19.*

| Test    | Frequency | Reading | Amplifier | Cable loss | Matching loss | Correction factor | limit | Margin |
|---------|-----------|---------|-----------|------------|---------------|-------------------|-------|--------|
| channel | MHz       | dBuV    | dB        | dB         | dB            | dBuV              | dBuV  | dB     |
|         | 56.704    | 68.9    | 26.7      | 0.3        | 5.7           | 48.2              | 56.5  | -8.3   |
| 3       | 61.253    | 82.1    | 26.7      | 0.3        | 5.7           | 61.4              | 69.5  | -8.1   |
|         | 65.715    | 68.3    | 26.7      | 0.3        | 5.7           | 47.6              | 56.5  | -8.9   |
|         | 62.711    | 70      | 26.7      | 0.3        | 5.7           | 49.3              | 56.5  | -7.2   |
| 4       | 67.214    | 83      | 26.7      | 0.3        | 5.7           | 62.3              | 69.5  | -7.2   |
|         | 71.723    | 69.4    | 26.7      | 0.3        | 5.7           | 48.7              | 56.5  | -7.8   |

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**§15.115(b)(2)(ii) – Output terminal conducted spurious emission measurement**

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**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 system was tested to 2000 MHz.

During the 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    |
|-------------------|---------------------------|---------|---------------|-------------|
| Leader Instrument | NTSC pattern generator    | LCG-400 | 2050017       | N/R         |
| HP                | Spectrum analyzer         | 8566B   | 2332A02816    | 10-Nov-2004 |
| HP                | Spectrum analyzer display | 85662A  | 3026A20081    | 10-Nov-2004 |
| HP                | Quasi-Peak adaptor        | 85650A  | 3107A01505    | 10-Nov-2004 |
| Inmet             | Matching Pad              | 9079    | N/A           | N/R         |
| HP                | Pre-amplifier             | 8447D   | 2944A06639    | 15-Aug-2005 |
| HP                | Pre-amplifier             | 8449B   | 3008A01978    | 10-Aug-2005 |

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

## Test Procedure

The RF output terminal was connected to the test receiver through the matching pad (75-50 ohm) with pre-amplifier connected. RF output was measured under the EUT operating mode. Result is displayed on the spectrum analyzer. Leader generate bar pattern onto the EUT. Spectrum was checked in each test mode and operation mode, and the maximum measured data were reported.

Tested frequency range were from 30MHz to more than 4.6MHz below the visual carrier frequency, and from more than 4.7MHz above the visual carrier frequency to 1000MHz.

## 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:

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

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:

**-7.2 dB** at 67.214 MHz at channel 4

**Environmental Conditions**

|                    |          |
|--------------------|----------|
| Temperature:       | 15 °C    |
| Relative Humidity: | 40%      |
| ATM Pressure:      | 1010mbar |

*\*Testing was performed by Oscar Au on 2005-11-19.*

| Test    | Frequency | Reading | Amplifier | Cable loss | Matching loss | Correction factor | limit | Margin |
|---------|-----------|---------|-----------|------------|---------------|-------------------|-------|--------|
| channel | MHz       | dBuV    | dB        | dB         | dB            | dBuV              | dBuV  | dB     |
|         | 56.704    | 68.9    | 26.7      | 0.3        | 5.7           | 48.2              | 56.5  | -8.3   |
| 3       | 61.253    | 82.1    | 26.7      | 0.3        | 5.7           | 61.4              | 69.5  | -8.1   |
|         | 65.715    | 68.3    | 26.7      | 0.3        | 5.7           | 47.6              | 56.5  | -8.9   |
|         | 62.711    | 70      | 26.7      | 0.3        | 5.7           | 49.3              | 56.5  | -7.2   |
| 4       | 67.214    | 83      | 26.7      | 0.3        | 5.7           | 62.3              | 69.5  | -7.2   |
|         | 71.723    | 69.4    | 26.7      | 0.3        | 5.7           | 48.7              | 56.5  | -7.8   |

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**§15.115(c)(1)(ii) – Antenna Transfer Switch measurement**

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**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 system was tested to 2000 MHz.

During the 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    |
|-------------------|---------------------------|---------|---------------|-------------|
| Leader Instrument | NTSC pattern generator    | LCG-400 | 2050017       | N/R         |
| HP                | Spectrum analyzer         | 8566B   | 2332A02816    | 10-Nov-2004 |
| HP                | Spectrum analyzer display | 85662A  | 3026A20081    | 10-Nov-2004 |
| HP                | Quasi-Peak adaptor        | 85650A  | 3107A01505    | 10-Nov-2004 |
| Inmet             | Matching Pad              | 9079    | N/A           | N/R         |
| HP                | Pre-amplifier             | 8447D   | 2944A06639    | 15-Aug-2005 |
| HP                | Pre-amplifier             | 8447D   | 2944A06639    | 15-Aug-2005 |

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

## Test Procedure

The RF input terminal was connected to the test receiver through the matching pad (75-50 ohm) with pre-amplifier connected. RF output was measured under the EUT operating mode. Result is displayed on the spectrum analyzer. A 75 ohm termination was connected to the RF output terminal. Spectrum was checked in each test mode and operation mode, and the maximum measured data were reported.

The spectrum was checked in each test mode and operation mode transfer switch isolation measurements were made on channel 3 or 4 video output frequency 61.2 or 67.2 and both positions of the transfer switch were checked for compliance.

## 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:

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

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:

**\* No significant data measurement was observed during the test.**

**Environmental Conditions**

|                    |          |
|--------------------|----------|
| Temperature:       | 15 °C    |
| Relative Humidity: | 40%      |
| ATM Pressure:      | 1010mbar |

*\*Testing was performed by Oscar Au on 2005-11-19.*

| Test    | Frequency | Reading                                           | Amplifier | Cable loss | Matching loss | Correction factor | limit | Margin |
|---------|-----------|---------------------------------------------------|-----------|------------|---------------|-------------------|-------|--------|
| channel | MHz       | dBuV                                              | dB        | dB         | dB            | dBuV              | dBuV  | dB     |
| 3       | 61.253    | During this test no significant readings detected |           |            |               |                   | 9.5   | -      |
| 4       | 67.214    |                                                   |           |            |               |                   | 9.5   | -      |