



# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

**Test Report No.** : E056R-029

**Applicant** : HUMAX Co., Ltd.

**Address** : Humax Bldg., 212-1, Yubang-Dong, Yongin-Si, Gyeonggi-Do, 449-080, Korea

**Manufacturer** : HUMAX Co., Ltd.

**Address** : Humax Bldg., 212-1, Yubang-Dong, Yongin-Si, Gyeonggi-Do, 449-080, Korea

**Type of Equipment** : IP TV RECEIVER (Peripheral Device for Class B Computing Device)

**FCC ID** : O6ZRG-200

**Model Name** : RG-200

**Serial number** : N/A

**Total page of Report** : 15 pages (including this page)

**Date of Incoming** : April 11, 2005

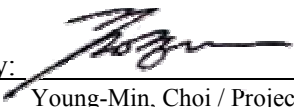
**Date of Issuing** : June 16, 2005

## SUMMARY

The equipment complies with the regulation; **FCC CFR 47 PART 15 SUBPART B, Class B.**

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production

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## CONTENTS

|                                                 | Page |
|-------------------------------------------------|------|
| 1. VERIFICATION OF COMPLIANCE.....              | 3    |
| 2. GENERAL INFORMATION.....                     | 4    |
| 2.1 PRODUCT DESCRIPTION.....                    | 4    |
| 2.2 MODEL DIFFERENCES.....                      | 4    |
| 2.3 RELATED SUBMITTAL(S) / GRANT(S) .....       | 4    |
| 2.4 TEST SYSTEM DETAILS .....                   | 4    |
| 2.5 TEST METHODOLOGY .....                      | 5    |
| 2.6 TEST FACILITY .....                         | 5    |
| 3. SYSTEM TEST CONFIGURATION.....               | 5    |
| 3.1 JUSTIFICATION .....                         | 5    |
| 3.2 EUT EXERCISE SOFTWARE.....                  | 5    |
| 3.3 CABLE DESCRIPTION .....                     | 6    |
| 3.4 NOISE SUPPRESSION PARTS ON CABLE .....      | 6    |
| 3.5 EQUIPMENT MODIFICATIONS .....               | 6    |
| 3.6 CONFIGURATION OF TEST SYSTEM .....          | 7    |
| 4. PRELIMINARY TEST .....                       | 7    |
| 4.1 AC POWER LINE CONDUCTED EMISSION TEST ..... | 7    |
| 4.2 RADIATED EMISSION TEST .....                | 7    |
| 5. FINAL RESULT OF MEASUREMENT .....            | 8    |
| 5.1 CONDUCTED EMISSION TEST.....                | 8    |
| 5.2 RADIATED EMISSION TEST .....                | 11   |
| 6. FIELD STRENGTH CALCULATION .....             | 14   |
| 7. LIST OF TEST EQUIPMENT.....                  | 15   |

**1. VERIFICATION OF COMPLIANCE**

APPLICANT : HUMAX Co., Ltd.  
ADDRESS : Humax Bldg., 212-1, Yubang-Dong, Yongin-Si, Gyeonggi-Do, 449-080, Korea  
CONTACT PERSON : Mr. Jung-Jae, Choi / Engineering Manager  
TELEPHONE NO : +82-31-600-6362  
FCC ID : O6ZRG-200  
MODEL NO/NAME : RG-200  
BRAND NAME : HUMAX  
SERIAL NUMBER : N/A  
DATE : June 16, 2005

|                                                         |                                                      |
|---------------------------------------------------------|------------------------------------------------------|
| EQUIPMENT CLASS                                         | JBP - Peripheral Device for Class B Computing Device |
| E.U.T. DESCRIPTION                                      | IP TV RECEIVER – UNINTENTIONAL RADIATOR              |
| THIS REPORT CONCERNS                                    | ORIGINAL GRANT                                       |
| MEASUREMENT PROCEDURES                                  | ANSI C63.4: 2003                                     |
| TYPE OF EQUIPMENT TESTED                                | PRE-PRODUCTION                                       |
| KIND OF EQUIPMENT<br>AUTHORIZATION REQUESTED            | CERTIFICATION                                        |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC RULES PART(S)   | PART 15 SUBPART B, SECTION 15.101                    |
| MODIFICATIONS ON THE EQUIPMENT<br>TO ACHIEVE COMPLIANCE | No                                                   |
| FINAL TEST WAS CONDUCTED ON                             | 3 METER OPEN AREA TEST SITE                          |

- This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.
- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



## 2. GENERAL INFORMATION

### 2.1 Product Description

The HUMAX Co., Ltd., Model RG-200 (referred to as the EUT in this report) is an IP TV RECEIVER that is two kinds of memory types, HDD or CF memory, and has a RF modulator for TV interfacing and Peripheral Device for Class B Computing Device functions. The report for the TV INTERFACE DEVICE with Part 15 shall be issued with other report number and submitted as composite device simultaneously. Product specification described herein was obtained from product data sheet or user's manual.

|                                              |                                                                                                                            |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| CHASSIS TYPE                                 | Metal                                                                                                                      |
| LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz) | 14.31818MHz, 16.83MHz, 24.576MHz, 25MHz, 33MHz, 66MHz, 48MHz and 133MHz on the main board.<br>24.000MHz on the front board |
| NUMBER OF LAYERS                             | 4 Layers: Main Board, 2Layers: SCART Board and Front Board,<br>1 Layer: PU311S                                             |
| ELECTRICAL RATING                            | AC 120V~, 60Hz, 2.0A                                                                                                       |
| TUNER M/N / MFR                              | RMVP13450WD / SAMSUNG                                                                                                      |
| EXTERNAL TERMINALS                           | Video Out, Audio Out, S-Video Out, Optical Out, Coaxial Out, IR Out, RS-232 Port, VGA Port, USB 2 Ports, Ethernet Port     |

### 2.2 Model Differences

-. None

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

Original submittal only

### 2.4 Test System Details

The model numbers for all the equipments which were used in the tested system is:

| Model   | Manufacturer    | FCC ID | Description          | Connected to |
|---------|-----------------|--------|----------------------|--------------|
| RG-200  | HUMAX Co., Ltd. | N/A    | IP TV RECEIVER (EUT) | -            |
| PP05LC  | Dell Computer.  | N/A    | Notebook PC          | EUT          |
| LT201CB | KTV Global      | DoC    | LCD TV               | EUT          |
| LT 416  | LEADER          | N/A    | Pattern Generator    | EUT          |
| MO56UO  | N/A             | N/A    | Mouse                | EUT          |
| 3500U   | BTC             | N/A    | Keyboard             | EUT          |



## 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

## 2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

## 3. SYSTEM TEST CONFIGURATION

### 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

| DEVICE TYPE | MANUFACTURER        | MODEL/PART NUMBER | FCC ID |
|-------------|---------------------|-------------------|--------|
| Main Board  | HUMAX Co., Ltd.     | N/A               | N/A    |
| Front Board | HUMAX Co., Ltd.     | RG-200 FRONT      | N/A    |
| Power Board | Sung Ho Electronics | PE 311S           | N/A    |
| HDD         | Seagate             | ST380012ACE       | N/A    |
| Memory      | N/A                 | M2S5H04A PS       | N/A    |
| Scart Board | HUMAX Co., Ltd.     | RG-200 SCART      | N/A    |

### 3.2 EUT exercise Software

- The EUT was operated with moving picture program that is recorded in memory(HDD or CF memory) during the test. The Notebook PC was connected to the EUT in order to the ping test via the LAN port from remote location.

### 3.3 Cable Description

|                   | Power Cord Shielded (Y/N) | I/O cable Shielded (Y/N) | Length (M)     |
|-------------------|---------------------------|--------------------------|----------------|
| IP TV RECEIVER    | N                         | N                        | 1.5(P), 1.5(D) |
| Notebook PC       | N                         | -                        | 1.5(P)         |
| LCD TV            | N                         | N                        | 1.5(P), 1.5(D) |
| Pattern Generator | N                         | N                        | 1.5(P), 1.5(D) |
| Mouse             | N/A                       | N                        | 1.5(D)         |
| Keyboard          | N/A                       | N                        | 1.5(D)         |

\* The marked “(P)” means the Power Cable and “(D)” means Signal Cable.

### 3.4 Noise Suppression Parts on Cable

|                   | Ferrite Bead (Y/N) | Location | Metal Hood (Y/N) | Location        |
|-------------------|--------------------|----------|------------------|-----------------|
| IP TV RECEIVER    | N                  | N/A      | Y                | BOTH END        |
| Notebook PC       | -                  | -        | -                | -               |
| LCD TV            | N                  | N/A      | Y                | BOTH END        |
| Pattern Generator | N                  | N/A      | Y                | BOTH END        |
| Mouse             | N                  | N/A      | Y                | Notebook PC END |
| Keyboard          | N                  | N/A      | Y                | Notebook PC END |

### 3.5 Equipment Modifications

-. None

### 3.6 Configuration of Test System

Line Conducted Test: The power of the EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2003 7.2.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emission test was conducted using the procedure in ANSI C63.4: 2003 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

## 4. PRELIMINARY TEST

### 4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

| Operation Mode                                                                                 | The Worse operating condition (Please check one only) |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| The EUT was operated with moving picture program that is recorded in memory(HDD or CF memory). | X                                                     |

### 4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

| Operation Mode                                                                                 | The Worse operating condition (Please check one only) |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| The EUT was operated with moving picture program that is recorded in memory(HDD or CF memory). | X                                                     |

## 5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

### 5.1 Conducted Emission Test

Humidity Level : 43 % Temperature: 21 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107(a)  
Type of Test : CLASS B  
Result : PASSED BY -3.33 dB at 0.34 MHz under HDD type(Average mode)

EUT : IP TV RECEIVER Date: April 14, 2005  
Operating Condition : The EUT was operated with moving picture program.  
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)  
Operating Condition : The HDD was installed into the EUT.

| Frequency<br>(MHz) | Line | Peak (dBuV)    |            | Margin<br>(dB) |
|--------------------|------|----------------|------------|----------------|
|                    |      | Emission level | Q.P Limits |                |
| 0.20               | H    | 49.88          | 63.61      | -13.73         |
| 0.34               | N    | 46.90          | 59.20      | -12.30         |
| 0.61               | N    | 40.80          | 56.00      | -15.20         |
| 2.37               | N    | 40.77          | 56.00      | -15.23         |
| 5.09               | N    | 44.33          | 60.00      | -15.67         |
| 5.28               | H    | 45.21          | 60.00      | -14.79         |
| Frequency<br>(MHz) | Line | Average (dBuV) |            | Margin<br>(dB) |
|                    |      | Emission level | Limits     |                |
| 0.20               | H    | 42.74          | 53.61      | -10.87         |
| 0.34               | N    | 45.87          | 49.20      | -3.33          |
| 0.61               | N    | 40.35          | 46.00      | -5.65          |
| 5.28               | H    | 40.22          | 50.00      | -9.78          |

Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line

See next page for an overview sweep performed with peak and average detector.





Operating Condition : The CF type memory was installed into the EUT.

| Frequency<br>(MHz) | Line | Peak (dBuV)    |            | Margin<br>(dB) |
|--------------------|------|----------------|------------|----------------|
|                    |      | Emission level | Q.P Limits |                |
| 0.20               | N    | 49.98          | 63.61      | -13.63         |
| 0.40               | N    | 41.96          | 57.85      | -15.89         |
| 0.73               | N    | 38.39          | 56.00      | -17.61         |
| 1.39               | H    | 36.94          | 56.00      | -19.06         |
| 6.27               | N    | 46.30          | 60.00      | -13.70         |
| 6.69               | H    | 45.96          | 60.00      | -14.04         |
| Frequency<br>(MHz) | Line | Average (dBuV) |            | Margin<br>(dB) |
|                    |      | Emission level | Limits     |                |
| -                  |      |                |            |                |
| -                  |      |                |            |                |

Line Conducted Emission Tabulated Data

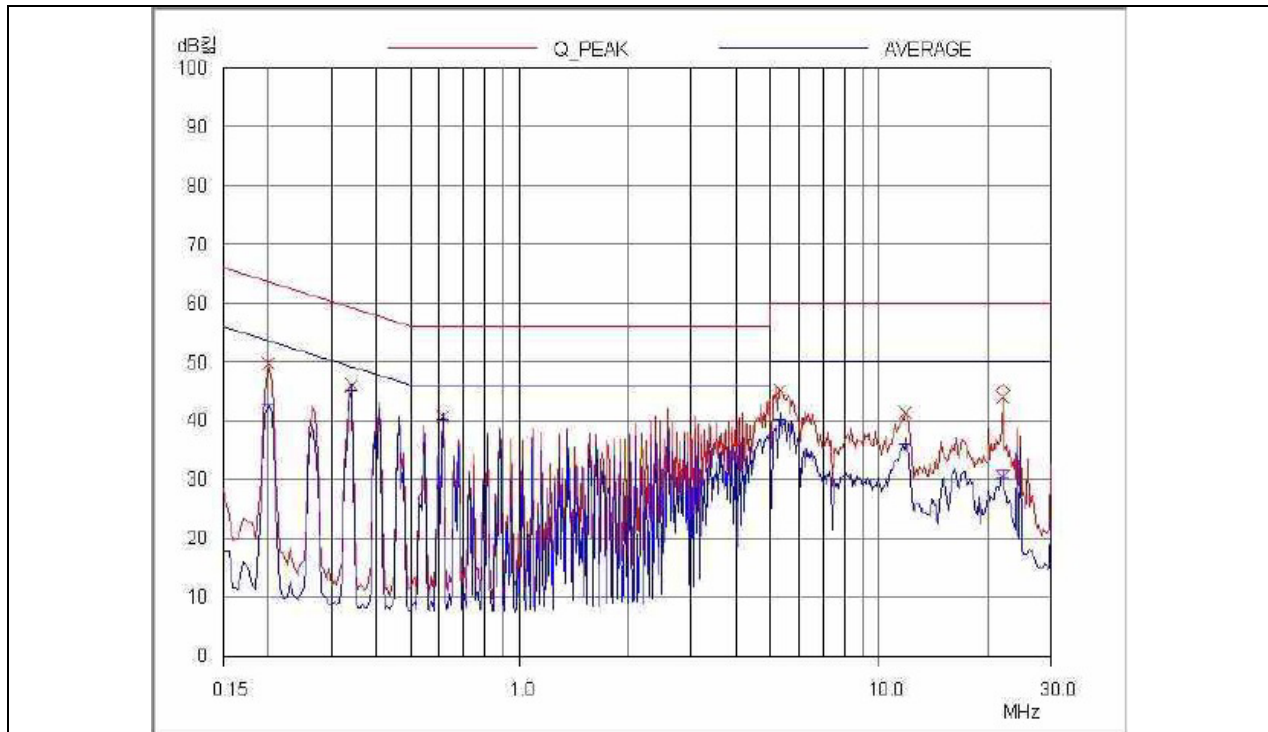
Remark : "H": Hot Line, "N": Neutral line

Average mode was not measured, because Peak values were under the Average limit.

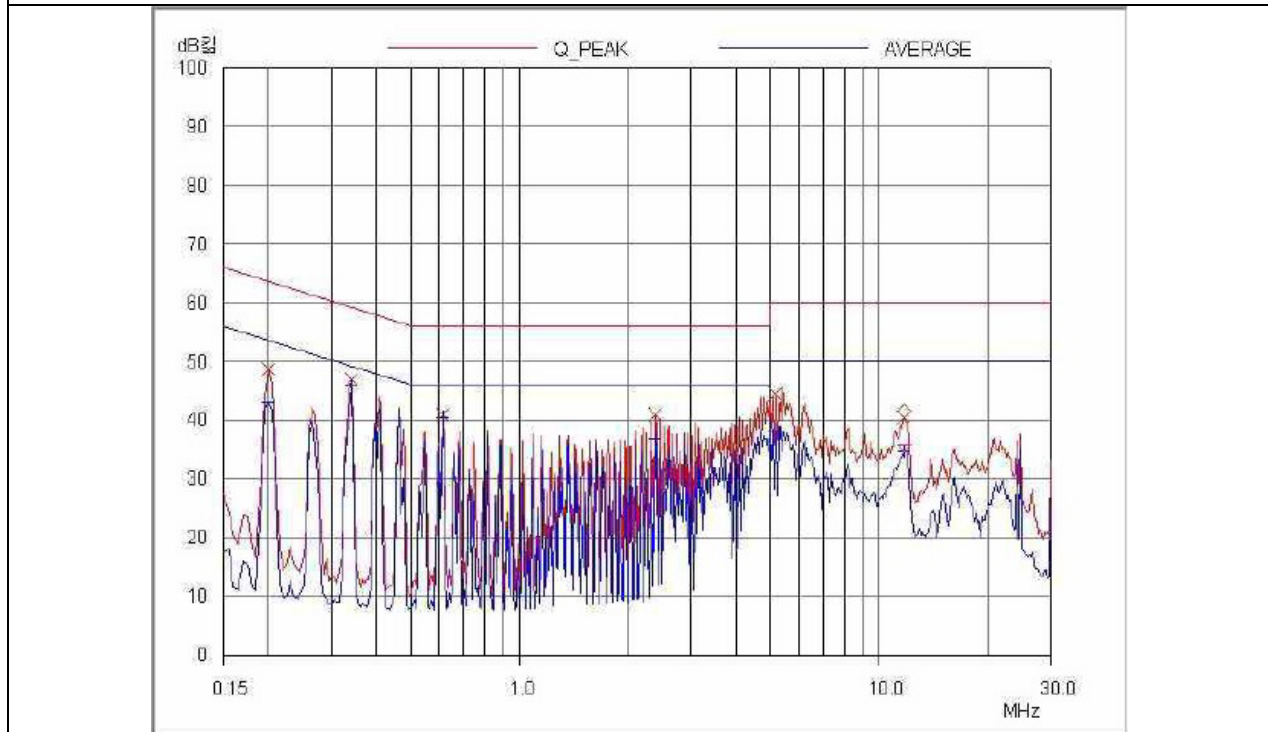
See next page for an overview sweep performed with peak detector.

Tested by: Sue-Yong, Lee / Test Engineer

Operating Condition : The HDD was installed into the EUT.



## HOT LINE



## NEUTRAL LINE

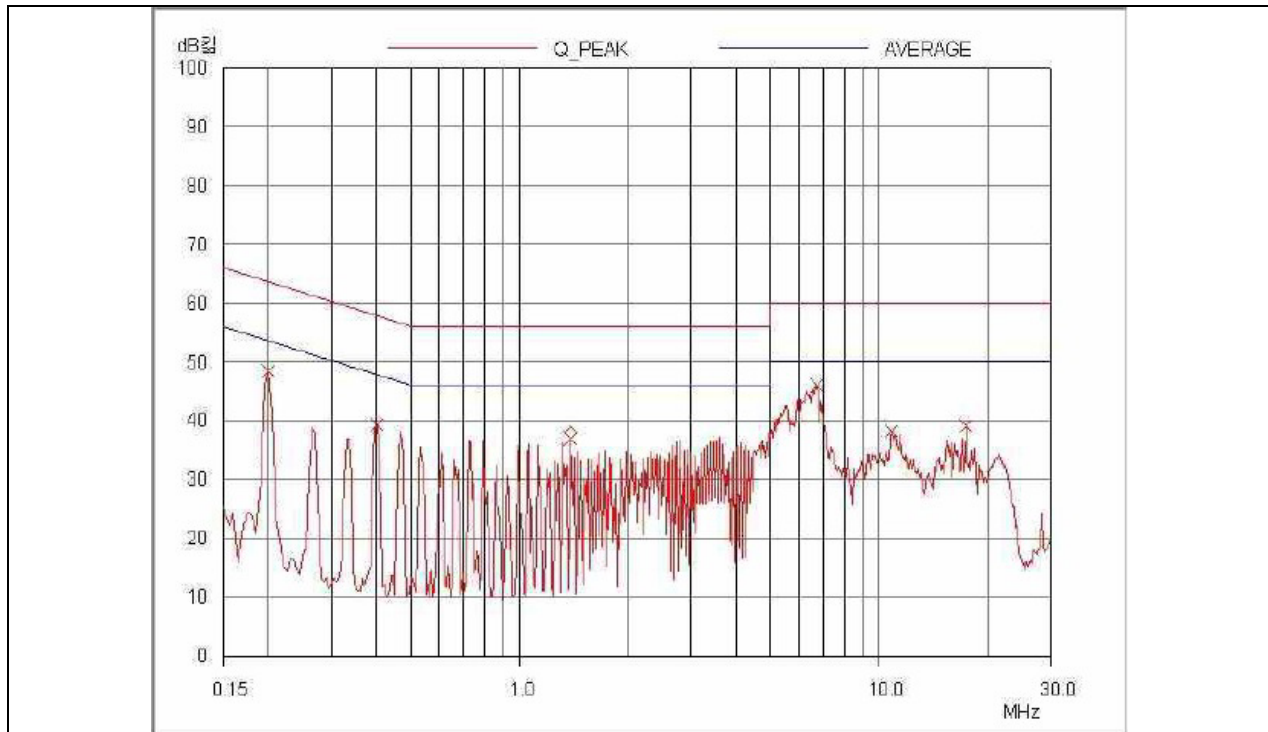
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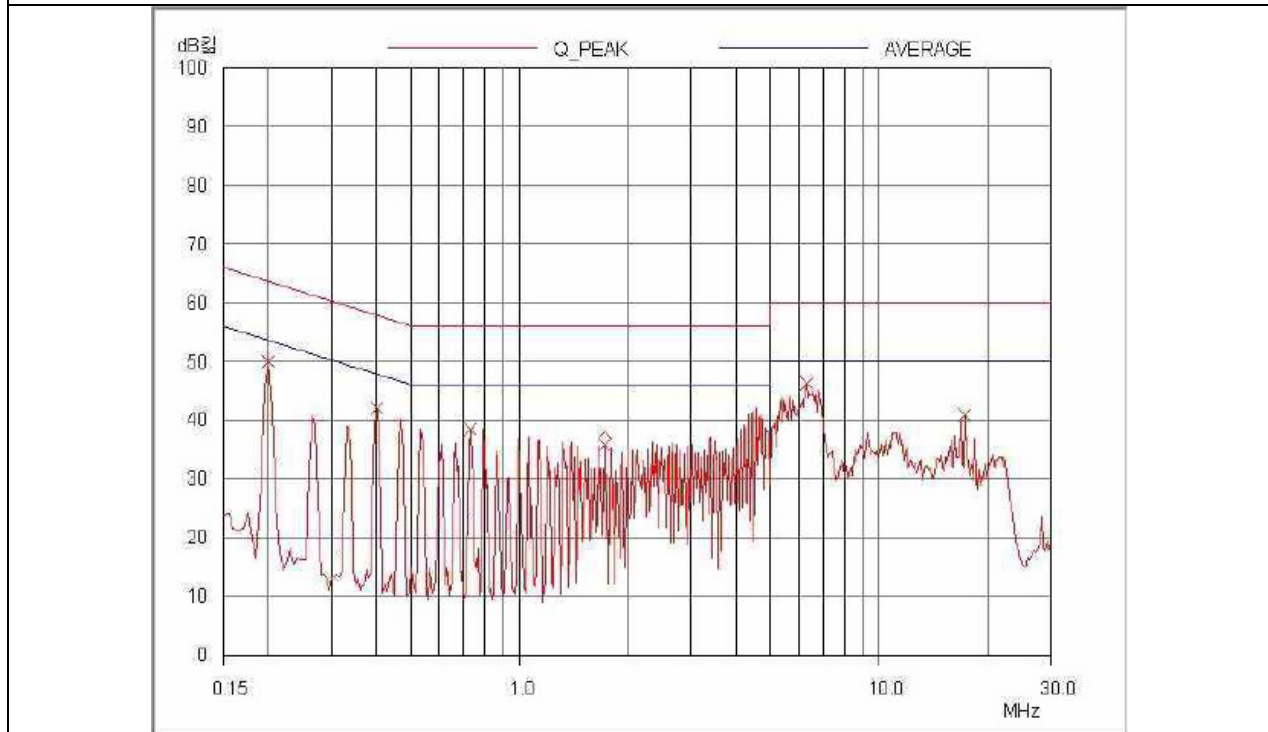
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(TEL: +82-31-746-8500, FAX: +82-31-746-8700)

**EMC Testing Dept** : 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)

Operating Condition : The CF type memory was installed into the EUT.



## HOT LINE



## NEUTRAL LINE

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**HEAD OFFICE** : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-705, Korea  
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**EMC Testing Dept** : 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)



## 5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 41 % Temperature: 20 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109(a)  
 Type of Test : CLASS B  
 Result : PASSED BY -4.13dB at 398.23MHz under HDD Type

EUT : IP TV RECEIVER Date: April  
 20, 2005

Operating Condition : The EUT was operated with moving picture program.

Frequency range : 30MHz – 2000MHz

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

Distance : 3 Meter

Operating Condition : The HDD was installed into the EUT.

| Radiated Emission |                | Ant  | Correction Factors |               | Total            | FCC               |                |
|-------------------|----------------|------|--------------------|---------------|------------------|-------------------|----------------|
| Freq.<br>(MHz)    | Amp.<br>(dBuV) | Pol. | Ant.<br>(dBuV/m)   | Cable<br>(dB) | Amp.<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
| 164.70            | 20.22          | V    | 15.47              | 2.40          | 38.09            | 43.52             | -5.43          |
| 197.64            | 18.14          | V    | 15.88              | 2.80          | 36.82            | 43.52             | -6.70          |
| 239.31            | 21.54          | V    | 16.77              | 3.23          | 41.54            | 46.02             | -4.48          |
| 298.42            | 13.96          | V    | 20.04              | 3.78          | 37.78            | 46.02             | -8.24          |
| 398.23            | 22.08          | H    | 15.42              | 4.39          | 41.89            | 46.02             | -4.13          |
| 431.18            | 16.98          | H    | 16.28              | 4.46          | 37.72            | 46.02             | -8.30          |
| 798.43            | 10.90          | H    | 20.41              | 7.19          | 38.50            | 46.02             | -7.52          |



Operating Condition : The CF type memory was installed into the EUT.

| Radiated Emission |                | Ant          | Correction Factors |               | Total            | FCC               |                |
|-------------------|----------------|--------------|--------------------|---------------|------------------|-------------------|----------------|
| Freq.<br>(MHz)    | Amp.<br>(dBuV) | Pol.<br>Pol. | Ant.<br>(dBuV/m)   | Cable<br>(dB) | Amp.<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
| 64.89             | 24.56          | V            | 6.49               | 1.50          | 32.55            | 40.00             | -7.45          |
| 164.70            | 18.44          | V            | 15.47              | 2.40          | 36.31            | 43.52             | -7.21          |
| 197.64            | 18.60          | V            | 15.88              | 2.80          | 37.28            | 43.52             | -6.24          |
| 239.31            | 17.78          | V            | 16.77              | 3.23          | 37.78            | 46.02             | -8.24          |
| 382.73            | 20.55          | H            | 15.07              | 4.33          | 39.95            | 46.02             | -6.07          |
| 649.21            | 16.15          | H            | 19.26              | 5.69          | 41.10            | 46.02             | -4.92          |
| 719.95            | 13.89          | H            | 20.83              | 6.60          | 41.32            | 46.02             | -4.70          |

Tested by: Sue-Yong, Lee / Test Engineer



## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

---

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)



## 7. LIST OF TEST EQUIPMENT

| No. | EQUIPMENTS               | MFR.        | MODEL       | SER. NO.     | LAST CAL | DUE CAL | USE |
|-----|--------------------------|-------------|-------------|--------------|----------|---------|-----|
| 1.  | Test receiver            | R/S         | ESVS10      | 827864/005   | DEC/04   | 12MONTH | ■   |
| 2.  | Test receiver            | R/S         | ESHS 10     | 834467/007   | MAY/04   | 12MONTH | ■   |
| 3.  | Spectrum analyzer        | HP          | 8566B       | 3407A08547   | JUL/04   | 12MONTH |     |
| 4.  | Spectrum analyzer        | HP          | 85680B      | 3001A04955   | APR/05   | 12MONTH | ■   |
| 5.  | RF preselector           | HP          | 85685A      | 3107A01264   | APR/05   | 12MONTH | ■   |
| 6.  | Quasi-Peak Adapter       | HP          | 8574B       | 2811A01432   | APR/05   | 12MONTH | ■   |
| 7.  | TRILOG Broadband Antenna | Schwarzbeck | VULB9163    | VULB9163 166 | FEB/05   | 12MONTH |     |
| 8.  | Biconical antenna        | EMCO        | 3104C       | 9109-4443    | MAY/04   | 12MONTH |     |
|     |                          | Schwarzbeck | VHA9103     | 91031852     | JAN/05   |         | ■   |
| 9.  | Log Periodic antenna     | EMCO        | 3146        | 9109-3213    | FEB/05   | 12MONTH |     |
|     |                          |             |             | 9109-3217    | MAY/04   |         |     |
|     |                          | Schwarzbeck | 9108-A(494) | 62281001     | JAN/05   |         | ■   |
| 10. | LISN                     | EMCO        | 3825/2      | 9109-1867    | JUL/04   | 12MONTH |     |
|     |                          |             |             | 9109-1869    | OCT/04   |         | ■   |
|     |                          | Schwarzbeck | NSLK 8126   | 8126-404     | MAY/04   |         | ■   |
| 11. | Position Controller      | HD GmbH     | HD100       | N/A          | N/A      | N/A     | ■   |
| 12. | Turn Table               | HD GmbH     | DS420S      | N/A          | N/A      | N/A     | ■   |
| 13. | Antenna Master           | HD GmbH     | MA240       | N/A          | N/A      | N/A     | ■   |