

**HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.**

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**TEST REPORT**

**Manufacture;**

Aomni International

463-841) C-601 Intelli-G-2  
Jeongja-Dong 24, Bundang-Gu  
Seongnam-Si, Gyeonggi-Do, Korea

Date of Issue: March 28. 2007

Test Report No.: HCT-F07-0309

Test Site: HYUNDAI CALIBRATION & CERTIFICATION  
TECHNOLOGIES CO., LTD.

HCT FRN: 0005-8664-21

**FCC ID :**

**MODEL:**

**U6DAL170A1**

**AL170A1**

**HL-1700XV**


Rule Part(s): Part 15 & 2  
Equipment Class: FCC Class B Peripheral Device (JBP)  
Standard(s): FCC Class B: (CISPR 22)

LCD Panel: D-Sub, T-Port, DC In, Video In, Audio In, HDMI, ANT In,  
LC171W03/ LG PHILIPS LCD

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

  
Report prepared by  
: Kun-Hyoung Kim  
Test engineer of EMC Tech.Part

  
Approved by  
: Sang Jun LEE  
Manager of EMC Tech.Part



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# MEASUREMENT REPORT

## 1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

<b>Applicant Name:</b>	<b>Aomni International</b>
<b>Address:</b>	<b>463-841) C-601 Inteli-G-2 Jeongja-Dong 24, Bundang-Gu Seongnam-Si, Gyeonggi-Do, Korea</b>

- **FCC ID :** U6DAL170A1
- **Equipment Class:** FCC Class B Peripheral Device (JBP)
- **EUT Type:** LCD TV MONITOR
- **Model(s):** AL170A1  
HL-1700XV
- **Max input resolution:** 1280 X 768 X 60 Hz
- **Input power:** DC + 18 External power adaptor
- **Power consumption:** 54 W
- **Rule Part(s):** FCC Part 15 Subpart B
- **Test Procedure(s):** ANSI C63.4 (2003)
- **Dates of Tests:** March 27. 2007 ~ March 29. 2007
- **Place of Tests:** 254-1,MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO,467-701,KOREA

## 2.1 INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) was used in determining radiated and conducted emissions emanating from **Aomni International LCD TV MONITOR FCC ID: U6DAL170A1**

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, MAEKOK-RI, HOBUP-MYUN, ICHON-SI, KYOUNGKI-DO, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 23, 2003 (Confirmation Number: EA90661)

## 3.1 PRODUCT INFORMATION

### 3.2 Equipment Description

Equipment Under Test (EUT) is **Aomni International LCD TV MONITOR**  
**(FCC ID: U6DAL170A1)**

Function and Display Specification	
Display Size	17.1-Inch 16 : 9 Diagonal Screen
Display Mode	Variable 4 Modes (4:3 Mode/ 16:9 x 3 Modes)
Pixel Format	1280 x 768 Physical Pixel
Contrast Ratio	600:1
Brightness	450 cd/m <sup>2</sup>
Max Input Resolution	1280 x 768 / 60Hz
Input Compatible	Multiple input compatible
Video	Advanced motion digital/Motion-Adaptive De-interlace process, Digital progressive line scaling.
Tuner Module	TV/CATV (ATSC)
Programming	Favorite channel programming, Time Set, Set the Sleep timer
HDTV Input	480i/p (60Hz) , 576ip (50Hz), 720p (60Hz), 1080i (50, 60Hz)
Color Temperature	Selectable 3 Mode (Warm, Normal, Cool)
Dimension / Weight	
Main Only	1216 (W) x 732 (H) x 87.3 (D) / 50 kg
With Stand	1216 (W) x 798 (H) x 299 (D) / 55 kg
With Stand and Speaker	1416 (W) x 798 (H) x 299 (D) / 59 kg
Miscellaneous	
Audio	Built-in amplifier and two speaker (7Watt/Typ.) systems (optional), Selectable fixed/variable audio output (optional)
External Control	Front OSD Button Control, Remote control, RS232C Control
Power Consumption	
Input Power	DC +18 External Power Adapter
Power Consumption	54 Watt
Connectivity	
TV1, 2 Input	RF/CATV (ATSC)
Composite Input	RCA x 1Port (AV Input )
S-Video Input	Mini Din 4Pin x 1Port
PC Input	Mini D-Sub 15Pin x 1Port
Audio Input	Phone Jack x 1Port
Speaker Output	Cinch Type x 4Port (Stereo L/R)
External Control Port	Phone Jack x 1Port
HDMI Port	HDMI x 1Port
SPDIF Port	SPDIF (Optical) x 1Port (5.1 Channel)

### EMI Suppression Devices:

Modifications were made to the device. Please refer to the next page.

## 1. Attached the Gasket





## 4.1 Description of Tests(Conducted)

### 4.2 Powerline Conducted RFI (150kHz- 30MHz)

The power line conducted RFI measurements were performed according to **ANSI C63.4 (2003)**.

The EUT was placed on a non-conducting 1.0 by 1.5 meter table which is 0.8 meters in height and 0.40 meters away from the vertical wall of the shielded enclosure. Power to the EUT is provided through a Rohde & Schwarz 50  $\Omega$  / 50 uH Line Impedance Stabilization Network (LISN) and the support equipment through a separate Solar 50  $\Omega$  / 50 uH Line- Conducted Test Facility LISN. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME. The spectrum was scanned from 150kHz to 30 MHz. Each maximum EME was remeasured using an EMI receiver. The detector function of the receiver was set to CISPR quasi- peak and average mode with the bandwidth set to 9 kHz. Each emission was maximized consistent with the typical applications by varying the configuration of the test sample. Interface cables were connected to the available interface ports of the test unit. The effect of varying the position of cables was investigated to find the configuration that produces maximum Diagram emission. Excess cable lengths were bundled at the center with 30- 40cm. in length. The worst-case configuration is noted in the test report and the photographs are attached. Each EME reported was calibrated using the Rohde & Schwarz SMT signal generator and are listed on Table 1. RFI Conducted FCC Class B.

RFI CONDUCTED	FCC CLASS B Limits dB(uV)	
	ANSI C63.4 (2003) Quasi-Peak	ANSI C63.4 (2003) Quasi-Peak
Freq. Range		
150kHz - 0.5MHz	66-56**	56-46**
0.5MHz – 5MHz	56	46
5MHz - 30MHz	60	50
**Limits decreases linearly with the logarithm of frequency		

Table 1. RFI Conducted Limits

## 4.3 Description of Tests (Radiated)

### Radiated Emissions

Preliminary measurements were made indoors at 3 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The spectrum was scanned from 30 to 1000 MHz using Tri-log antenna, and above 1 GHz using linearly polarized horn antennas. For frequencies above 1 GHz, horn antennas were used. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition. The EMI receiver detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120 kHz. The EUT, support equipment, and interconnecting cables were arranged to the configuration that produces the maximum EME emission found during preliminary scan. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Horizontal and vertical antenna polarizations were checked. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/ or support equipment, and powering the monitor the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.

ITE Radiated Limits			
Frequency (MHz)	FCC Limit @ 3m. Quasi- Peak dB[μV / m]	FCC Limit @ 10m.* Quasi – Peak dB [μV / m]	CISPR Limit @ 10m. Quasi-Peak dB [μV / m]
30-88	40.0	29.5	30.0
88-216	43.5	33.0	30.0
216-230	46.0	35.6	30.0
230-960	46.0	35.6	37.0
960-1000	54.0	43.5	37.0
> 1000	54.0	43.5	No Specified Limit
* Limit extrapolated 20 dB/decade			

Table 2. Radiated Class B limits @ 10-meters



## 5.1 Support Equipment Used

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
LCD TV MONITOR	Aomni International	AL170A1 HL-1700XV	DoC	EUT
PC	DELL	OPTIPLEXGX620	DoC	EUT
Adaptor	Asian power Devices inc	DA-60F19	DoC	EUT
Mouse	DELL	MO56U0	DoC	-
Serial Mouse	LOGITECH	M-M28	DoC	-
Keyboard	DELL	SK-8115	DoC	EUT

## 5.2 Cable Description

		Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
LCD TV MONITOR (EUT)	D-Sub	N/A	Y	D(1.6)
	T-Port	N/A	Y	D(1.8)
	DC In	N	Y	P(1.8)
	Video In	N/A	Y	D(1.6)
	Audio In	N/A	Y	D(1.6)
	HDMI	N/A	Y	D(1.8)
	S-Video In	N/A	Y	D(1.6)
	ANT In	N/A	Y	D(3.0)
PC	USB (Mouse)	N/A	Y	D(1.8)
	USB (Keyboard)	N/A	Y	D(1.8)
	Parallel (Printer)	N/A	Y	D(1.8)
	AC In	N	N/A	P(1.8)
	Serial (Mouse)	N/A	Y	D(1.6)

The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

### 5.3 Noise Suppression Parts on Cable. (I/O CABLE)

		Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
<b>LCD TV MONITOR (EUT)</b>	<b>T-Port</b>	N	N/A	N	N/A
	<b>Video In</b>	N	N/A	Y	<b>Both END</b>
	<b>Audio In</b>	N	N/A	Y	<b>Both END</b>
	<b>HDMI</b>	N	N/A	Y	<b>Both END</b>
	<b>S-Video</b>	N	N/A	Y	<b>Both END</b>
	<b>Ant. In</b>	N	N/A	Y	<b>Both END</b>
	<b>D-Sub</b>	Y	<b>Both END</b>	Y	<b>Both END</b>
<b>PC</b>	<b>USB(Mouse)</b>	N	N/A	Y	<b>PC END</b>
	<b>USB(Keyboard)</b>	N	N/A	Y	<b>PC END</b>
	<b>Serial(Mouse)</b>	N	N/A	Y	<b>PC END</b>
	<b>Parallel(Printer)</b>	Y	<b>Both END</b>	Y	<b>Both END</b>

## 6.1 CONDUCTED TEST DATA

[D-Sub mode]

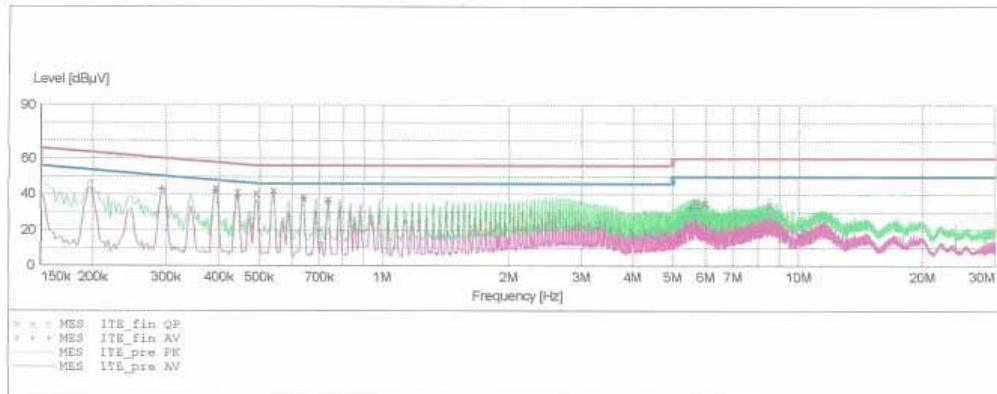
HCT

EMC TEST LAB.

EUT: AL170A1  
 Manufacturer: Aomni International  
 Operating Condition: 1280 X 768 60 Hz (DSUB)  
 Test Site: SHIELD ROOM  
 Operator: KH-KIM  
 Test Specification: CISPR 22 CLASS B  
 Comment: N

### SCAN TABLE: "CISPR 22 Voltage"

Short Description:		CISPR 22 Voltage					
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
Frequency	Frequency	Width					
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
5.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				



### MEASUREMENT RESULT: "ITE\_fin\_QP"

3/27/2007 5:00PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.392600	43.30	10.0	58	14.7	---	---
0.442600	41.40	10.0	57	15.6	---	---
0.490100	40.50	10.1	56	15.7	---	---
0.540000	42.10	10.1	56	13.9	---	---
0.640000	38.10	10.1	56	17.9	---	---
0.735000	37.30	10.1	56	18.7	---	---
5.685000	36.20	10.7	60	23.8	---	---
5.980000	35.20	10.8	60	24.8	---	---
8.535000	34.00	11.0	60	26.0	---	---

## MEASUREMENT RESULT: "ITE\_fin AV"

3/27/2007 5:00PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.292600	43.20	10.0	51	7.2	---	---
0.392600	42.50	10.0	48	5.5	---	---
0.442600	39.10	10.0	47	7.9	---	---
0.540000	41.20	10.1	46	4.8	---	---
0.640000	37.70	10.1	46	8.3	---	---
0.735000	36.20	10.1	46	9.8	---	---
5.490000	32.40	10.7	50	17.6	---	---
5.540000	32.40	10.7	50	17.6	---	---
5.735000	32.40	10.7	50	17.6	---	---

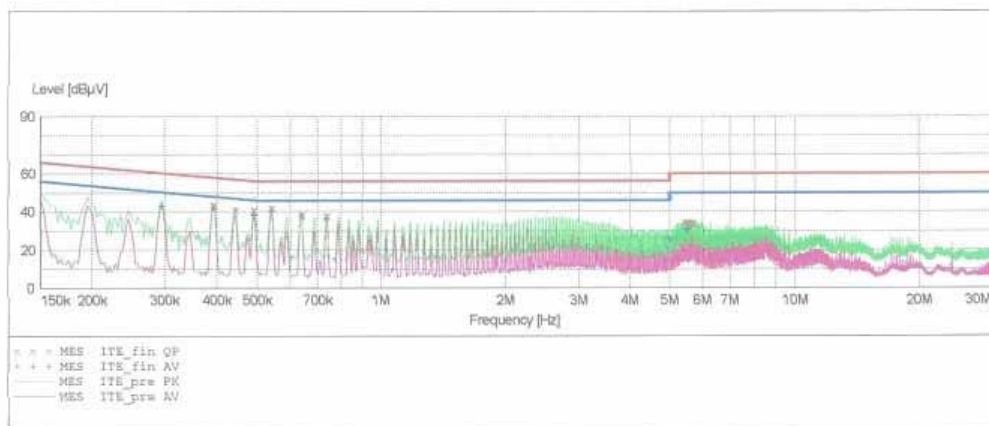
HCT

EMC TEST LAB.

EUT: AL170A1  
 Manufacturer: Aomni International  
 Operating Condition: 1280 X 768 60Hz(DSUB)  
 Test Site: SHIELD ROOM  
 Operator: KH-KIM  
 Test Specification: CISPR 22 CLASS B  
 Comment: H

**SCAN TABLE: "CISPR 22 Voltage"**

Short Description:		CISPR 22 Voltage				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



**MEASUREMENT RESULT: "ITE\_fin QP"**

3/27/2007 4:57PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.392600	43.20	10.0	58	14.8	---	---
0.442600	40.80	10.0	57	16.2	---	---
0.490100	40.90	10.1	56	15.3	---	---
0.540000	42.10	10.1	56	13.9	---	---
0.640000	38.30	10.1	56	17.7	---	---
0.735000	37.90	10.1	56	18.1	---	---
5.440000	34.40	10.7	60	25.6	---	---
5.540000	34.10	10.7	60	25.9	---	---
5.685000	33.90	10.7	60	26.1	---	---

## MEASUREMENT RESULT: "ITE\_fin AV"

3/27/2007 4:57PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.295100	43.20	10.0	50	7.1	---	---
0.392600	42.50	10.0	48	5.5	---	---
0.490100	38.40	10.1	46	7.7	---	---
0.540000	41.10	10.1	46	4.9	---	---
0.640000	38.00	10.1	46	8.0	---	---
0.735000	36.90	10.1	46	9.1	---	---
5.000000	26.10	10.6	46	19.9	---	---
5.490000	31.00	10.7	50	19.0	---	---
5.540000	30.70	10.7	50	19.3	---	---

**NOTES:**

1. All modes of operation were investigated, and the worst-case emissions are reported.
2. The conducted limits are listed on Table 1 (Page 6).
3. Line H = Hot    Line N = Neutral

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\*\* Measurements using CISPR quasi-peak mode.



## 7.1 RADIATED TEST DATA

[D-Sub]

Frequency MHz	Reading dBuV	Ant. Factor dB / m	Cable Loss dB	ANT POL (H / V)	Total dBuV / m	Limit dBuV / m	Margin dB
33.3	13.3	11.3	1.3	V	25.9	30.0	4.1
64.8	13.4	10.8	1.8	V	26.0	30.0	4.0
129.6	11.4	11.8	2.6	H	25.8	30.0	4.2
183.5	10.3	10.8	3.0	H	24.1	30.0	5.9
324.0	16.1	13.2	4.1	V	33.4	37.0	3.6
331.8	14.5	13.4	4.2	H	32.1	37.0	4.9
432.0	10.2	15.8	4.8	V	30.8	37.0	6.2
663.6	4.1	19.9	5.9	H	29.9	37.0	7.1

Radiated Measurements at 10-meters.

### NOTES:

1. All modes of operation were investigated, and the worst-case emissions are reported.
2. The radiated limits are listed on Table 2 (Page 7).

\*\*\* Measurements using CISPR quasi-peak mode.

## 8.1 Sample Calculations

$$\text{dB } \mu\text{V} = 20 \log_{10} (\mu\text{V})$$

$$\text{dB } \mu\text{V} = \text{dBm} + 107$$

### 8.2 Example 1:

**@ 0.54 MHz**

Class B limit	= 46.0 dB $\mu\text{V}$
Reading	= 41.2 dB $\mu\text{V}$ (calibrated level)

<b>Margin</b>	= 41.2 - 46.0 = - 4.8 dB $\mu\text{V}$
	= <b>9.7 dB below limit</b>

### 8.3 Example 2:

**@ 324.0 MHz**

Class B limit	= 37.0 dB $\mu\text{V}/\text{m}$
Reading	= 16.1 dB $\mu\text{V}/\text{m}$ (calibrated level)
Antenna Factor + Cable Loss	= 17.3 dB
Total	= 33.4 dB $\mu\text{V}/\text{m}$

<b>Margin</b>	= 33.4 - 37.0 = - 3.6 dB $\mu\text{V}/\text{m}$
	= <b>3.6 dB below limit</b>

## 9.1 Test Equipment

<u>Type</u>	<u>Manufacture</u>	<u>Model Number</u>	<u>CAL Due Date</u>
Conducted Emission			
EMI Test Receiver	Rohde & Schwarz	ESCI	2007.08.24
LISN	Rohde & Schwarz	ESH2-Z5	2007.04.26
LISN	EMCO	703125	2007.04.26
PULSE LIMITER	Rohde & Schwarz	ESH3-Z2	2007.10.30
Radiated Emission			
EMI Test Receiver	Rohde & Schwarz	ESCI40	2007.11.06
TRILOG Antenna	Schwarzbeck	9160	2007.04.17
Antenna Position Tower	HD	MA240	N/A
Turn Table	EMCO	1050	N/A
Controller	HD GmbH	HD 100	N/A
Slide Bar	HD GmbH	KMS 560	N/A

## 10.1 Test Software Used

**The EUT was acted standby mode during radiated and conducted testing.**

NOTE: This is a sample of the basic program used during the test. However, during testing, a different software program may be used; whichever determines the worst-case condition. In addition, the program used also depends on the number and type of devices being tested.

## 10.1 Conclusion

The data collected shows that **Aomni International LCD TV MONITOR (FCC ID: U6DAL170A1)** complies with §15.107 and §15.109 of the FCC Rules.