

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

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TEST REPORT

Manufacture;
Aomni International

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

FRN: 0016269607

Date of Issue: Apr. 30. 2007

Test Report No.: HCT-F07-0410

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

HCT FRN: 0005-8664-21

FCC ID :

U6DAL320V1

MODEL:

AL320V1

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

LCD Panel: Speaker R, Speaker L, PC Audio In, HDMI Out, D-Sub, Serial, Component Out, Audio Out, S-Video Out, AV 3 In, AV 2 In, AV 1 In, TV ANT. In AC IN
LC320W01/ 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
: Kyoung Houn, Seo
Test engineer of EMC Tech.Part

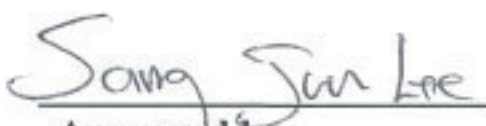

Approved by
: Sang Jun LEE
Manager of EMC Tech.Part



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MEASUREMENT REPORT

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.

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

- **FCC ID :** U6DAL320V1
- **Equipment Class:** FCC Class B Peripheral Device (JBP)
- **EUT Type:** LCD TV Monitor
- **Model(s):** AL320V1
- **Max input resolution:** 1280 X 1024 X 60 Hz
- **Input power:** AC 100 ~ 240V 50/60 Hz
- **Power consumption:** 150 W
- **Rule Part(s):** FCC Part 15 Subpart B
- **Test Procedure(s):** ANSI C63.4 (2003)
- **Dates of Tests:** Apr. 25. 2007 ~ Apr. 27. 2007
- **Place of Tests:** 254-1,MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO,467-701,KOREA

2. 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 9 kHz to 40 GHz (ANSI C63.4-2003) was used in determining radiated and conducted emissions emanating from **Aomni International LCD TV Monitor FCC ID: U6DAL320V1**

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. PRODUCT INFORMATION

3.1 Equipment Description

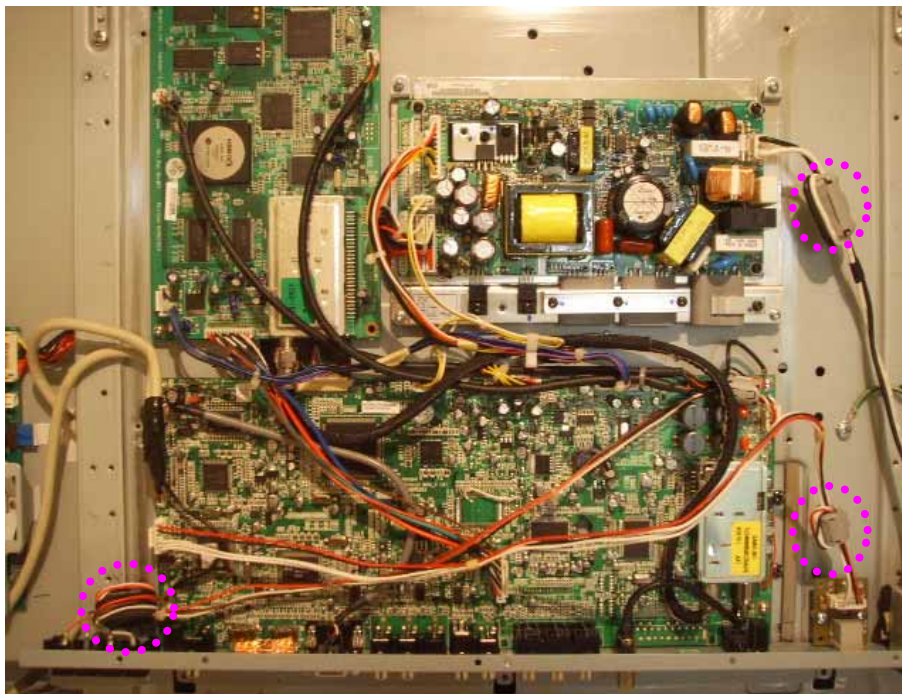
Equipment Under Test (EUT) is **Aomni International LCD TV Monitor**
(FCC ID: U6DAL320V1)

32" LCD TV	
Function and Display Specification	
Display Size	32-Inch 16 : 9 Diagonal Screen
Display Mode	Variable 5 Modes (4:3 Mode / 16:9 X 4 Modes)
Pixel Format	1366 X 768 Physical Pixel
Contrast Ratio	500 : 1
Brightness	500 cd/m ²
Max Input Resolution	1280 X 1024 / 60Hz
PIP	Advanced multi-windows viewing PIP (picture in picture) with four selectable window positions on Video mode
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), 576i/p (50Hz), 720p (50/60Hz), 1080i (50/60Hz)
Color Temperature	Selectable 5 Mode (Warm1, 2, Normal, Cool1, 2)
Dimension/Weight	
Main Only	792mm (W) X 486.6mm (H) X 101mm (D) / 18 kg
With Stand	792mm (W) X 554.6mm (H) X 270mm (D) / 20 kg
With Stand and Speaker	992mm (W) X 554.6mm (H) X 270mm (D) / 24 kg
Miscellaneous	
Audio	Built-in amplifier and two speaker (7Watt/Typ.) systems (optional), Selectable fixed/variable audio output (optional)
External Control	Front OSD Key Control, Remote Control, RS232C Control
Power Consumption	
Input Power	AC 100 ~ 240V 50/60Hz
Power Consumption	150 Watt (Max)
Connectivity	
TV1, 2 Input	RF/CATV (ATSC)
Composite Input/Output	RCA X 4Port (AV Inpu 1, 2, 3)
COMPONENT Input	RCA X 1Port (Y, Pb/Cb, Pr/Cr: 480i, 480p, 576i, 576p, 720p, 1080i)
S-VIDEO Input	Mini Din 4Pin X 1Port
PC Input	Mini D-Sub 15Pin X 1Port / HDTV Input (480p, 576p, 720p (50/60Hz), 1080i (50/60Hz))
AUDIO Input/Output	RCA X 6Port
Speaker Output	Cinch Type X 4Port (Stereo L/R), Head Phone Jack X 1Port
External Control Port	Mini D-Sub 9Pin X 1Port
HDMI Port	HDMI X 2Port
SPDIF Port	SPDIF (Optical) X 1Port (5.1 Channel)

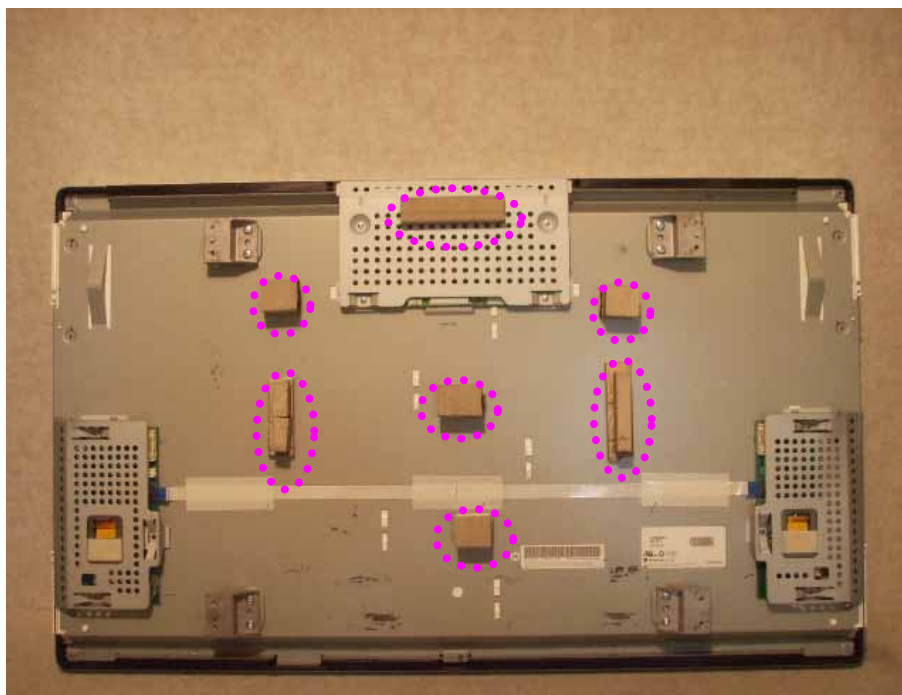
EMI Suppression Devices:

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

1. Attached the Core



2. Attached the Gasket



4. Description of Tests(Conducted)

4.1 Powerline Conducted RFI (150 kHz- 30 MHz)

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 Ω / 50 uH Line Impedance Stabilization Network (LISN) and the support equipment through a separate Solar 50 Ω / 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 150 kHz 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)	
	Quasi-Peak	Average
Freq. Range		
150 kHz - 0.5 MHz	66-56**	56-46**
0.5 MHz – 5 MHz	56	46
5 MHz – 30 MHz	60	50
**Limits decreases linearly with the logarithm of frequency		

Table 1. RFI Conducted Limits

5. 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[μ V / m]	FCC Limit @ 10m.* Quasi – Peak dB [μ V / m]	CISPR Limit @ 10m. Quasi-Peak dB [μ V / 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

6. Support Equipment Used

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
LCD TV Monitor	Aomni International	AL320V1	DoC	EUT
PC	DELL	OPTIPLEXGX620	DoC	EUT END
Mouse	DELL	MO56U0	DoC	PC END
Serial Mouse	LOGITECH	M-M28	DoC	PC END
Keyboard	DELL	SK-8115	DoC	PC END
Printer	H.P	C4569A	DoC	PC END
MPEG-Recorder	Tektronix	MTX 100	DoC	-
MPEG-Recorder	Tektronix	MTX 100	DoC	-
All Channel Converter	EIDEN	4200C-006	DoC	-
8VSB Modulator	EIDEN	3313b-002	DoC	-
TV PATTERN GENERATOR	PROMAX	GV-698	DoC	-

6.1 Cable Description

		Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
LCD TV Monitor (EUT)	Speaker R	N/A	N	(D)0.3
	Speaker L	N/A	N	(D) 0.3
	PC Audio In	N/A	Y	(D)1.6
	HDMI Out	N/A	Y	(D)1.8
	D-Sub	N/A	Y	(D)1.8
	Serial	N/A	Y	(D)1.5
	Component Out	N/A	Y	(D)1.6
	Audio Out	N/A	Y	(D)1.6
	S-Video Out	N/A	Y	(D)1.6
	AV 3 In	N/A	Y	(D)1.6
	AV 2 In	N/A	Y	(D)1.6
	AV 1 In	N/A	Y	(D)1.6
	TV ANT. In	N/A	Y	(D)3.0
	AC IN	N	N/A	(P)1.8
PC	USB	N/A	Y	(D)1.8
	USB	N/A	Y	(D)1.8
	Serial	N/A	Y	(D)1.8
	Parallel	N/A	Y	(D)1.8
	AC In	N	N/A	(P)1.8
Monitor	AC In	N	N/A	(P)1.8
Printer	AC In	N	N/A	(P)1.8

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

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

		Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
LCD TV Monitor (EUT)	Speaker R	Y	EUT END	N	N/A
	Speaker L	Y	EUT END	N	N/A
	PC Audio In	N	N/A	Y	Both END
	HDMI Out	N	N/A	Y	Both END
	D-Sub	Y	Both END	Y	Both END
	Serial	N	N/A	Y	Both END
	Component Out	N	N/A	Y	Both END
	Audio Out	N	N/A	Y	Both END
	S-Video Out	N	N/A	Y	Both END
	AV 3 In	N	N/A	Y	Both END
	AV 2 In	N	N/A	Y	Both END
	AV1 In	N	N/A	Y	Both END
	TV ANT. Out	N	N/A	Y	Both END
PC	USB	N	N/A	Y	PC END
	USB	N	N/A	Y	PC END
	USB	N	N/A	Y	PC END
	Parallel	N	N/A	Y	Both END

7. CONDUCTED TEST DATA

[D-Sub mode]

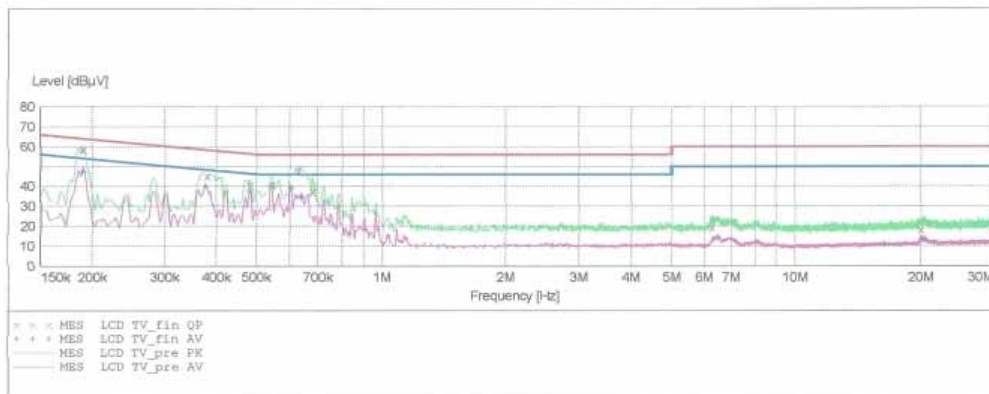
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EMC TEST LAB.

EUT: AL320V1
 Manufacturer: AOMNI
 Operating Condition: 1280 X 1024 60Hz
 Test Site: SHIELD ROOM
 Operator: KH-SEO
 Test Specification: CISPR 22 CLASS B
 Comment: H

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage			Detector	Meas. Time	IF Bandw.	Transducer
Start Frequency	Stop Frequency	Step 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: "LCD TV_fin QP"

4/25/2007 3:38PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.190100	58.50	10.0	64	5.5	---	---
0.380100	45.20	10.0	58	13.1	---	---
0.482600	40.80	10.1	56	15.5	---	---
0.545000	41.10	10.1	56	14.9	---	---
0.630000	47.70	10.1	56	8.3	---	---
0.680000	37.30	10.1	56	18.7	---	---
6.270000	19.60	10.8	60	40.4	---	---
20.040000	18.60	12.3	60	41.4	---	---
29.995000	17.00	12.8	60	43.0	---	---

MEASUREMENT RESULT: "LCD TV_fin AV"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.190100	47.50	10.0	54	6.6	---	---
0.377600	40.20	10.0	48	8.1	---	---
0.482600	38.20	10.1	46	8.1	---	---
0.540000	40.20	10.1	46	5.8	---	---
0.605000	39.20	10.1	46	6.8	---	---
0.640000	34.90	10.1	46	11.1	---	---
6.485000	14.50	10.8	50	35.5	---	---
16.365000	10.90	12.1	50	39.1	---	---
20.165000	13.80	12.3	50	36.2	---	---

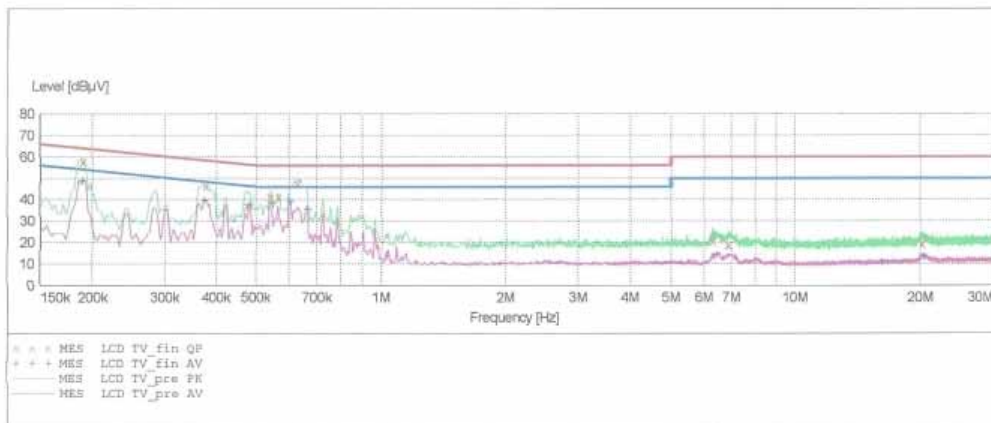
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EMC TEST LAB.

EUT: AL320V1
 Manufacturer: AOMNI
 Operating Condition: 1280 X 1024 60Hz
 Test Site: SHIELD ROOM
 Operator: KH-SEO
 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: "LCD TV_fin_QP"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.190100	57.80	10.0	64	6.3	---	---
0.377600	46.40	10.0	58	11.9	---	---
0.475100	37.10	10.1	56	19.3	---	---
0.540000	41.60	10.1	56	14.4	---	---
0.565000	41.10	10.1	56	14.9	---	---
0.630000	47.60	10.1	56	8.4	---	---
6.295000	20.80	10.8	60	39.2	---	---
6.865000	19.00	10.9	60	41.0	---	---
20.215000	19.50	12.3	60	40.5	---	---

MEASUREMENT RESULT: "LCD TV_fin AV"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.190100	48.90	10.0	54	5.1	---	---
0.375100	39.90	10.0	48	8.5	---	---
0.482600	38.10	10.1	46	8.2	---	---
0.545000	38.70	10.1	46	7.3	---	---
0.605000	39.40	10.1	46	6.6	---	---
0.665000	35.70	10.1	46	10.3	---	---
6.430000	14.40	10.8	50	35.6	---	---
16.170000	11.00	12.0	50	39.0	---	---
20.375000	13.50	12.3	50	36.5	---	---

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 7).
3. Line H = Hot Line N = Neutral

** Measurements using CISPR quasi-peak mode.

8. 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
315.0	14.1	13.0	4.1	H	31.2	37.0	5.8
472.4	10.2	16.6	5.0	V	31.8	37.0	5.2
539.9	9.3	17.8	5.3	V	32.4	37.0	4.6
658.6	7.4	19.8	5.9	V	33.1	37.0	3.9
823.2	4.9	22.1	6.5	H	33.5	37.0	3.5

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 8).

*** Measurements using CISPR quasi-peak mode.

9. Sample Calculations

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

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

9.1 Example 1:

@ 0.1901 MHz

Class B limit	= 54.0 dB μV
Reading	= 48.9 dB μV (calibrated level)

Margin	= 48.9 – 54.0 = - 5.1 dB μV
	= 5.1 dB below limit

9.2 Example 2:

@ 823.2 MHz

Class B limit	= 37.0 dB $\mu\text{V}/\text{m}$
Reading	= 4.9 dB $\mu\text{V}/\text{m}$ (calibrated level)
Antenna Factor + Cable Loss	= 28.6 dB
Total	= 33.5 dB $\mu\text{V}/\text{m}$

Margin	= 33.5 – 37.0 = - 3.5 dB $\mu\text{V}/\text{m}$
	= 3.5 dB below limit

10. 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	2008.04.20
LISN	EMCO	3816/2SH	2008.02.03
PULSE LIMITER	Rohde & Schwarz	ESH3-Z2	2007.10.30
Radiated Emission			
EMI Test Receiver	Rohde & Schwarz	ESCI40	2007.11.06
TRILOG Antenna	Schwarzbeck	9168	2008.03.19
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

11. 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.

12. Conclusion

The data collected shows that **Aomni International LCD TV Monitor (FCC ID: U6DAL320V1)** complies with §15.107 and §15.109 of the FCC Rules.