

Application for FCC Certificate
On Behalf of
LG Electronics U.S.A., Inc.

LCD Monitor

Model No.: W2240TV

Serial No.: E2009120803

FCC ID : BEJW2240TV

Prepared For : LG Electronics U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs,
NJ 07632, United States

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Report No. : ACI-F09141
Date of Test : Dec 29, 2009
Date of Report : Jan 04, 2010

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TEST REPORT FOR FCC CERTIFICATE

Applicant : LG Electronics U.S.A., Inc.
Manufacturer : LG Electronics Nanjing Display Co., Ltd.
EUT Description : LCD Monitor
(A) Model No. : W2240TV
(B) Serial No. : E2009120803
(C) Power Supply : 120V/60Hz

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 2008
AND ANSI C63.4-2003*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B (Class B) and ICES-003, Issue 4 February 2004 (CISPR 22:2002) limits both radiated and conducted emissions.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report shows that the EUT (M/N: W2240TV; S/N: E2009120803) which was tested in 3m anechoic chamber Dec 29, 2009 is technically compliance with the FCC official limits also.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report contains data that are not covered by the NVLAP accreditation.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Dec 29, 2009 Date of Report : Jan 04, 2010

Producer : Zeno Gu
ZENO GU / Assistant

Review : Byron Wu
BYRON WU / Supervisor

 For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory : Dio Yang
Authorized Signature EMC DIO YANG / Deputy Assistant Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description of Test Item	Standard	Limits	Results
EMISSION			
Conducted Disturbance at the Mains Terminal	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2008 AND ANSI C63.4-2003	15.107(a) Class B	Pass
Radiated Disturbance	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2008 AND ANSI C63.4-2003	15.109(a) Class B	Pass

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description	:	LCD Monitor
Type of EUT	:	☒ Production ☐ Pre-product ☐ Pro-type
Model No.	:	W2240TV
Serial No.	:	E2009120803
Real Power	:	42.00W
Applicant	:	LG Electronics U.S.A., Inc. 1000 Sylvan Avenue, Englewood Cliffs, NJ 07632, United States
Manufacturer	:	LG Electronics Nanjing Display Co., Ltd. No.346, Yao Xin Road, Economic & Technical Development Zone, Nanjing, China
LCD Panel	:	Manufacturer : LG Display M/N : LM215WF1 (TL) (A1)
Max Resolution	:	1920*1080@60Hz
D-Sub Cable #1	:	Shielded, Detachable, 1.85m, with two cores on cable
D-Sub Cable #2	:	Shielded, Detachable, 1.85m, with two cores in connector
DVI Cable #1	:	Shielded, Detachable, 1.85m, with two cores on cable
DVI Cable #2	:	Shielded, Detachable, 1.85m, with two cores in connector
Power Cord	:	Unshielded, Detachable, 1.80m
Note	:	After evaluation, the D-Sub cable#1 and DVI Cable#1 were used in the test for they will cause the maximum emission.

Remark:

The EUT is a LCD Monitor which input/output ports as follows:

- | | |
|--------------------|------------------------|
| (1) One D-Sub Port | : Connected with PC |
| (2) One DVI Port | : Connected with PC |
| (3) One AC In Port | : Connected with Power |

2.2 Peripherals

2.2.1 PC

Manufacturer : HP
Model Number : dx7400MT
Serial Number : CNG8130K89
Power Cord : Unshielded, Detachable, 1.8m
Certificate : FCC DoC; CE/EMC; VCCI; C-Tick; UL
BSMI (R33001) 3C (A000111)
MIC (E-A011-04-2659(B))

2.2.2 Printer

Manufacturer : HP
Model Number : C3990A
Serial Number : JPZX020487
Data Cable : Shielded, Detachable, 1.5m
Certificate : GS, CE/EMC, C-Tick, FCC DoC

2.2.3 Keyboard

Manufacturer : Microsoft
Model Number : RT2300
Serial Number : 7668200662248
Data Cable : Shielded, Undetachable, 1.8m
Certificate : CE/EMC, FCC DoC, VCCI, MIC, C-Tick,
BSMI

2.2.4 Mouse

Manufacturer : Microsoft
Model Number : RT2300
Serial Number : 6965712071551
Data Cable : Shielded, Undetachable, 1.85m.
Certificate : FCC DoC, VCCI, CE/EMC, MIC, GS

2.2.5 Modem

Manufacturer : TP-LINK
Model Number : TM-EC5658V
Serial Number : 07123301053
Data Cable : Shielded, Detachable, 1.8m
Certificate : FCC DoC, CE/EMC, CCC

2.3 Description of Test Facility

Site Description (Semi-Anechoic Chamber)	:	Sept. 17, 1998 file on Apr 29, 2009 Renewed Federal Communications Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, USA
Name of Firm	:	Audix Technology (Shanghai) Co., Ltd.
Site Location	:	3F 34Bldg 680 Guiping Rd, Caohejing Hi-Tech Park, Shanghai 200233, China
NVLAP Lab Code	:	200371-0

2.4 Measurement Uncertainty

Conducted Emission Expanded Uncertainty:	U = 1.26 dB
Radiated Emission Expanded Uncertainty :	U = 3.02 dB

3 CONDUCTED EMISSION TEST

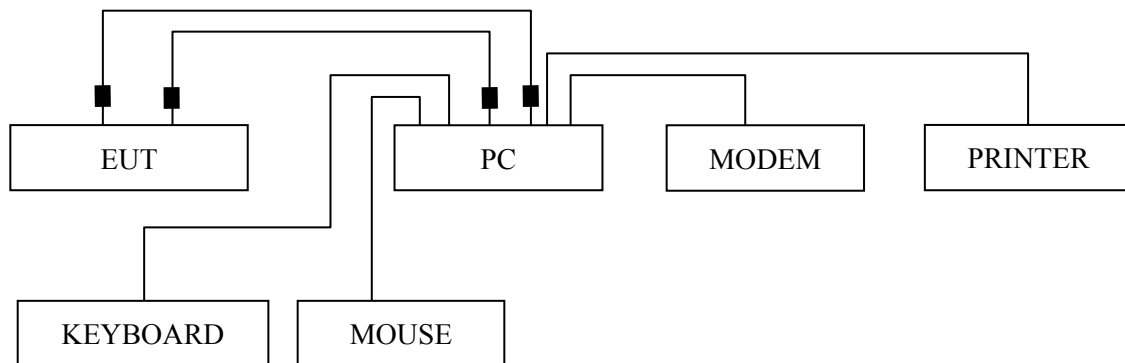
3.1.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Nov 21, 2009	Nov 21, 2010
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Apr 02, 2009	Apr 02, 2010
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Apr 02, 2009	Apr 02, 2010
4.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426389	Sep 19, 2009	Mar 19, 2010
5.	50 Ω Terminator	Anritsu	BNC	001	Apr 02, 2009	Apr 02, 2010
6.	Software	Audix	E3	SET00200 9804M592	--	--

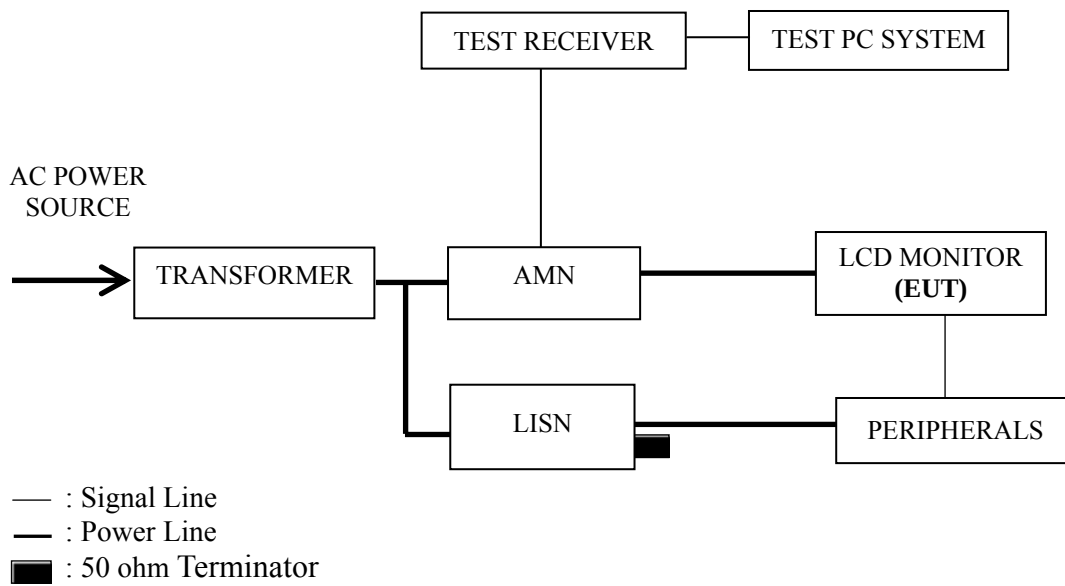
3.2 Block Diagram of Test Setup

3.2.1 EUT & Peripherals



■ : Ferrite core

3.2.2 Conducted Disturbance Test Setup



3.3 Conducted Emission Limit [FCC Part 15 Subpart B 15.107(a)]

Frequency Range (MHz)	Limits dB (μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 30	60	50
NOTE 1 – The lower limit shall apply at the transition frequencies. NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz		

3.4 Test Configuration

The EUT (listed in Sec.2.1) and the peripherals (listed in Sec 2.2) were installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner that tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

3.5.1 Setup the EUT and peripherals as shown in Sec. 3.2.

3.5.2 Turn on the power of all equipments and the EUT.

3.5.3 Set the contrast & brightness of EUT to maximum.

3.5.4 PC system ran the self-test program “EMC Test” by windows XP and sent “H” characters to EUT through graphic card, the EUT’s screen displayed and filled with “H” pattern by its resolution (Via D-Sub & DVI Input).

3.5.5 Repeat above procedure from 3.5.3 to 3.5.4 for difference test mode.

3.5.6 The other peripherals devices were driven and operated during the test.

3.5.7 The test modes are as follows:

M/N	Test Mode
W2240TV	D-Sub 640*480@60Hz
	D-Sub 1024*768@60Hz
	D-Sub 1680*1050@60Hz
	D-Sub 1920*1080@60Hz
	DVI 640*480@60Hz
	DVI 1024*768@60Hz
	DVI 1680*1050@60Hz
	DVI 1920*1080@60Hz

3.6 Test Procedures

The EUT and peripherals were connected to the power mains through an Artificial Mains Network (AMN). This provided a 50 ohm coupling impedance for the measuring equipment.

Both sides of AC line (Line & Neutral) were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed or manipulated according to ANSI C63.4:2003 during conducted emission test.

The bandwidth of R&S Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7.

3.7 Test Results

< PASS >

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits.

M/N	Test Mode	Data Page
W2240TV	D-Sub 640*480@60Hz	P12
	D-Sub 1024*768@60Hz	P13
	D-Sub 1680*1050@60Hz	P14
	D-Sub 1920*1080@60Hz	P15
	DVI 640*480@60Hz	P16
	DVI 1024*768@60Hz	P17
	DVI 1680*1050@60Hz	P18
	DVI 1920*1080@60Hz	P19

NOTE 1 – The **bold test mode** listed above means the worst test mode.

NOTE 2 – Factor = Cable Loss + AMN Factor.

NOTE 3 – Emission Level = Meter Reading + Factor.

NOTE 4 – “QP” means “Quasi-Peak” values, “AV” means “Average” values.

NOTE 5 – The worst case is for D-Sub 1920*1080@60Hz test mode. The worst emission is detected at 0.743 MHz (Average Value) with corrected signal level of 33.48 dB (μV) (limit is 46.00 dB (μV)), when the Neutral the EUT is connected to AMN.

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 48%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 640*480@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.180	44.53	0.22	44.75	64.50	19.75	QP
	0.303	38.74	0.25	38.99	60.15	21.16	
	0.641	32.93	0.28	33.21	56.00	22.79	
	4.114	37.02	0.42	37.44	56.00	18.56	
	9.966	38.33	0.49	38.82	60.00	21.18	
	21.830	43.00	0.86	43.86	60.00	16.14	
	0.180	25.59	0.22	25.81	54.50	28.69	AV
	0.303	22.76	0.25	23.01	50.15	27.14	
	0.641	31.35	0.28	31.63	46.00	14.37	
	4.114	27.41	0.42	27.83	46.00	18.17	
	9.966	27.46	0.49	27.95	50.00	22.05	
	21.830	32.46	0.86	33.32	50.00	16.68	
Neutral	0.182	46.49	0.20	46.69	64.42	17.73	QP
	0.303	38.72	0.23	38.95	60.15	21.20	
	0.641	33.49	0.27	33.76	56.00	22.24	
	3.107	35.06	0.41	35.47	56.00	20.53	
	6.951	33.80	0.48	34.28	60.00	25.72	
	22.535	30.81	0.79	31.60	60.00	28.40	
	0.182	28.88	0.20	29.08	54.42	25.34	AV
	0.303	24.59	0.23	24.82	50.15	25.33	
	0.641	32.40	0.27	32.67	46.00	13.33	
	3.107	21.03	0.41	21.44	46.00	24.56	
	6.951	19.06	0.48	19.54	50.00	30.46	
	22.535	20.36	0.79	21.15	50.00	28.85	

TEST ENGINEER: HUGH HUANG

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 48%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 1024*768@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.182	46.18	0.22	46.40	64.42	18.02	QP
	0.303	37.72	0.25	37.97	60.15	22.18	
	0.641	32.98	0.28	33.26	56.00	22.74	
	4.027	38.13	0.42	38.55	56.00	17.45	
	9.352	38.09	0.48	38.57	60.00	21.43	
	22.063	43.07	0.85	43.92	60.00	16.08	
	0.182	28.31	0.22	28.53	54.42	25.89	AV
	0.303	22.79	0.25	23.04	50.15	27.11	
	0.641	31.38	0.28	31.66	46.00	14.34	
	4.027	25.47	0.42	25.89	46.00	20.11	
	9.352	25.90	0.48	26.38	50.00	23.62	
	22.063	34.25	0.85	35.10	50.00	14.90	
Neutral	0.182	46.41	0.20	46.61	64.42	17.81	QP
	0.300	39.72	0.23	39.95	60.24	20.29	
	0.541	33.42	0.26	33.68	56.00	22.32	
	3.642	34.45	0.43	34.88	56.00	21.12	
	6.951	33.87	0.48	34.35	60.00	25.65	
	22.063	30.74	0.81	31.55	60.00	28.45	
	0.182	29.28	0.20	29.48	54.42	24.94	AV
	0.300	20.69	0.23	20.92	50.24	29.32	
	0.541	25.41	0.26	25.67	46.00	20.33	
	3.642	17.06	0.43	17.49	46.00	28.51	
	6.951	19.54	0.48	20.02	50.00	29.98	
	22.063	20.15	0.81	20.96	50.00	29.04	

TEST ENGINEER: HUGH HUANG

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 48%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 1680*1050@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.183	46.51	0.22	46.73	64.33	17.60	QP
	0.300	39.17	0.25	39.42	60.24	20.82	
	0.641	32.97	0.28	33.25	56.00	22.75	
	3.943	36.24	0.42	36.66	56.00	19.34	
	9.352	38.22	0.48	38.70	60.00	21.30	
	21.373	42.55	0.87	43.42	60.00	16.58	
	0.183	30.29	0.22	30.51	54.33	23.82	AV
	0.300	18.65	0.25	18.90	50.24	31.34	
	0.641	31.33	0.28	31.61	46.00	14.39	
	3.943	21.00	0.42	21.42	46.00	24.58	
	9.352	25.95	0.48	26.43	50.00	23.57	
	21.373	33.54	0.87	34.41	50.00	15.59	
Neutral	0.186	46.34	0.20	46.54	64.20	17.66	QP
	0.300	39.74	0.23	39.97	60.24	20.27	
	0.541	33.44	0.26	33.70	56.00	22.30	
	3.241	33.79	0.41	34.20	56.00	21.80	
	6.951	34.00	0.48	34.48	60.00	25.52	
	21.600	30.55	0.82	31.37	60.00	28.63	
	0.186	32.19	0.20	32.39	54.20	21.81	AV
	0.300	20.74	0.23	20.97	50.24	29.27	
	0.541	25.55	0.26	25.81	46.00	20.19	
	3.241	19.22	0.41	19.63	46.00	26.37	
	6.951	19.73	0.48	20.21	50.00	29.79	
	21.600	21.16	0.82	21.98	50.00	28.02	

TEST ENGINEER: HUGH HUANG

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 48%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 1920*1080@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.182	46.48	0.22	46.70	64.42	17.72	QP
	0.300	39.05	0.25	39.30	60.24	20.94	
	0.641	32.81	0.28	33.09	56.00	22.91	
	4.114	37.24	0.42	37.66	56.00	18.34	
	9.011	37.09	0.48	37.57	60.00	22.43	
	21.373	42.68	0.87	43.55	60.00	16.45	
	0.182	28.32	0.22	28.54	54.42	25.88	AV
	0.300	18.76	0.25	19.01	50.24	31.23	
	0.641	31.39	0.28	31.67	46.00	14.33	
	4.114	27.81	0.42	28.23	46.00	17.77	
	9.011	24.70	0.48	25.18	50.00	24.82	
	21.373	33.89	0.87	34.76	50.00	15.24	
Neutral	0.164	46.01	0.20	46.21	65.25	19.04	QP
	0.317	38.00	0.23	38.23	59.80	21.57	
	0.743	34.19	0.28	34.47	56.00	21.53	
	3.241	33.92	0.41	34.33	56.00	21.67	
	6.951	33.95	0.48	34.43	60.00	25.57	
	22.063	28.85	0.81	29.66	60.00	30.34	
	0.164	19.98	0.20	20.18	55.25	35.07	AV
	0.317	25.77	0.23	26.00	49.80	23.80	
	0.743	33.20	0.28	33.48	46.00	12.52	
	3.241	19.31	0.41	19.72	46.00	26.28	
	6.951	19.32	0.48	19.80	50.00	30.20	
	22.063	20.39	0.81	21.20	50.00	28.80	

TEST ENGINEER: HUGH HUANG

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 48%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : DVI 640*480@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.182	47.53	0.22	47.75	64.42	16.67	QP
	0.300	38.93	0.25	39.18	60.24	21.06	
	0.641	32.22	0.28	32.50	56.00	23.50	
	4.027	36.03	0.42	36.45	56.00	19.55	
	9.552	39.02	0.49	39.51	60.00	20.49	
	21.373	42.78	0.87	43.65	60.00	16.35	
	0.182	29.43	0.22	29.65	54.42	24.77	AV
	0.300	18.10	0.25	18.35	50.24	31.89	
	0.641	30.20	0.28	30.48	46.00	15.52	
	4.027	24.92	0.42	25.34	46.00	20.66	
	9.552	26.35	0.49	26.84	50.00	23.16	
	21.373	35.08	0.87	35.95	50.00	14.05	
Neutral	0.182	48.09	0.20	48.29	64.42	16.13	QP
	0.300	38.78	0.23	39.01	60.24	21.23	
	0.743	33.89	0.28	34.17	56.00	21.83	
	3.025	34.64	0.41	35.05	56.00	20.95	
	8.822	31.73	0.50	32.23	60.00	27.77	
	22.063	27.80	0.81	28.61	60.00	31.39	
	0.182	30.85	0.20	31.05	54.42	23.37	AV
	0.300	19.48	0.23	19.71	50.24	30.53	
	0.743	31.18	0.28	31.46	46.00	14.54	
	3.025	23.91	0.41	24.32	46.00	21.68	
	8.822	25.28	0.50	25.78	50.00	24.22	
	22.063	18.27	0.81	19.08	50.00	30.92	

TEST ENGINEER: HUGH HUANG

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 48%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : DVI 1024*768@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.182	48.36	0.22	48.58	64.42	15.84	QP
	0.300	38.97	0.25	39.22	60.24	21.02	
	0.641	32.40	0.28	32.68	56.00	23.32	
	4.027	38.06	0.42	38.48	56.00	17.52	
	9.552	36.47	0.49	36.96	60.00	23.04	
	20.924	40.88	0.87	41.75	60.00	18.25	
	0.182	29.42	0.22	29.64	54.42	24.78	AV
	0.300	18.19	0.25	18.44	50.24	31.80	
	0.641	30.42	0.28	30.70	46.00	15.30	
	4.027	25.00	0.42	25.42	46.00	20.58	
	9.552	26.60	0.49	27.09	50.00	22.91	
	20.924	32.12	0.87	32.99	50.00	17.01	
Neutral	0.182	47.27	0.20	47.47	64.42	16.95	QP
	0.300	39.12	0.23	39.35	60.24	20.89	
	0.641	32.71	0.27	32.98	56.00	23.02	
	3.642	32.77	0.43	33.20	56.00	22.80	
	6.951	34.62	0.48	35.10	60.00	24.90	
	21.600	29.80	0.82	30.62	60.00	29.38	
	0.182	30.13	0.20	30.33	54.42	24.09	AV
	0.300	19.82	0.23	20.05	50.24	30.19	
	0.641	31.51	0.27	31.78	46.00	14.22	
	3.642	18.63	0.43	19.06	46.00	26.94	
	6.951	21.35	0.48	21.83	50.00	28.17	
	21.600	20.29	0.82	21.11	50.00	28.89	

TEST ENGINEER: HUGH HUANG

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 48%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : DVI 1680*1050@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.183	48.11	0.22	48.33	64.33	16.00	QP
	0.300	38.08	0.25	38.33	60.24	21.91	
	0.641	32.55	0.28	32.83	56.00	23.17	
	4.027	37.13	0.42	37.55	56.00	18.45	
	9.352	38.45	0.48	38.93	60.00	21.07	
	21.147	43.73	0.86	44.59	60.00	15.41	
	0.183	31.08	0.22	31.30	54.33	23.03	AV
	0.300	18.43	0.25	18.68	50.24	31.56	
	0.641	30.68	0.28	30.96	46.00	15.04	
	4.027	25.25	0.42	25.67	46.00	20.33	
	9.352	25.77	0.48	26.25	50.00	23.75	
	21.147	32.08	0.86	32.94	50.00	17.06	
Neutral	0.180	46.66	0.20	46.86	64.50	17.64	QP
	0.300	39.16	0.23	39.39	60.24	20.85	
	0.641	32.87	0.27	33.14	56.00	22.86	
	2.809	33.26	0.39	33.65	56.00	22.35	
	6.951	34.60	0.48	35.08	60.00	24.92	
	22.063	30.72	0.81	31.53	60.00	28.47	
	0.180	26.87	0.20	27.07	54.50	27.43	AV
	0.300	20.00	0.23	20.23	50.24	30.01	
	0.641	31.69	0.27	31.96	46.00	14.04	
	2.809	18.15	0.39	18.54	46.00	27.46	
	6.951	20.33	0.48	20.81	50.00	29.19	
	22.063	20.35	0.81	21.16	50.00	28.84	

TEST ENGINEER: HUGH HUANG

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 48%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : DVI 1920*1080@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.182	46.65	0.22	46.87	64.42	17.55	QP
	0.303	37.64	0.25	37.89	60.15	22.26	
	0.641	32.79	0.28	33.07	56.00	22.93	
	4.027	34.15	0.42	34.57	56.00	21.43	
	9.552	36.81	0.49	37.30	60.00	22.70	
	21.373	43.23	0.87	44.10	60.00	15.90	
	0.182	28.89	0.22	29.11	54.42	25.31	AV
	0.303	22.33	0.25	22.58	50.15	27.57	
	0.641	30.85	0.28	31.13	46.00	14.87	
	4.027	25.48	0.42	25.90	46.00	20.10	
	9.552	27.08	0.49	27.57	50.00	22.43	
	21.373	34.55	0.87	35.42	50.00	14.58	
Neutral	0.182	46.61	0.20	46.81	64.42	17.61	QP
	0.300	37.42	0.23	37.65	60.24	22.59	
	0.641	33.05	0.27	33.32	56.00	22.68	
	2.809	30.13	0.39	30.52	56.00	25.48	
	6.951	31.37	0.48	31.85	60.00	28.15	
	21.600	27.30	0.82	28.12	60.00	31.88	
	0.182	29.61	0.20	29.81	54.42	24.61	AV
	0.300	20.29	0.23	20.52	50.24	29.72	
	0.641	31.87	0.27	32.14	46.00	13.86	
	2.809	18.02	0.39	18.41	46.00	27.59	
	6.951	19.82	0.48	20.30	50.00	29.70	
	21.600	19.66	0.82	20.48	50.00	29.52	

TEST ENGINEER: HUGH HUANG

4 RADIATED EMISSION TEST

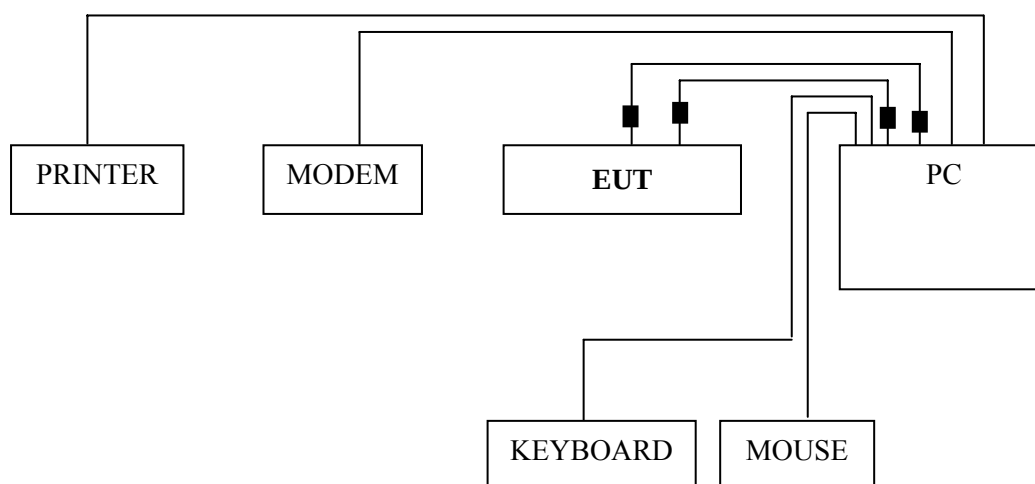
4.1 Test Equipment

The following test equipments are used during the radiated emission test in a semi-anechoic chamber:

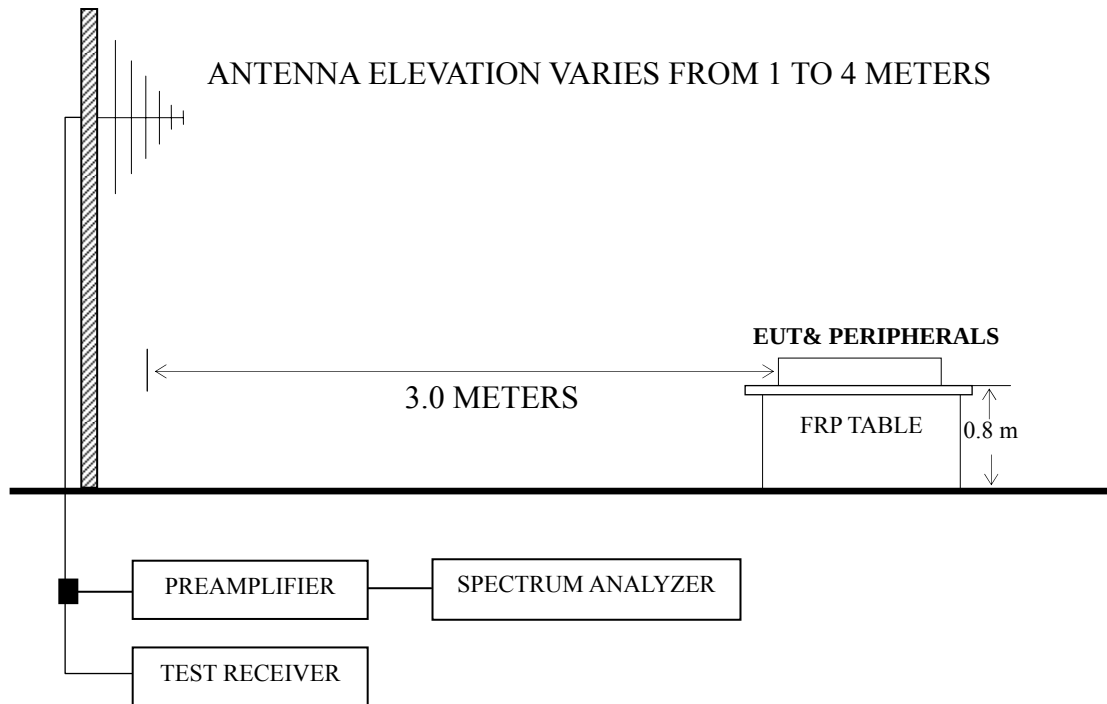
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESVS10	844594/001	Mar 07, 2009	Mar 07, 2010
2.	Preamplifier	Agilent	8447D	2944A10548	Sep 19, 2009	Mar 19, 2010
3.	Preamplifier	HP	8449B	3008A00864	Apr 29, 2009	Apr 29, 2010
4.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 14, 2008	May 14, 2010
5.	Spectrum	Agilent	E7405A	MY45106600	May 19, 2009	May 19, 2010
6.	Software	Audix	E3	SET00200 9912M295-2	--	--

4.2 Block Diagram of Test Setup

4.2.1 EUT and Peripherals



4.2.2 Radiated emission test setup



■ : 50 ohm Coaxial Switch

4.3 Radiated Emission Limit [FCC Part 15 Subpart B 15.109(a)]

Frequency (MHz)	Distance (m)	Field strength limits	
		($\mu\text{V/m}$)	dB ($\mu\text{V/m}$)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

NOTE 1 - Emission Level dB ($\mu\text{V/m}$) = 20 log Emission Level ($\mu\text{V/m}$)

NOTE 2 - The tighter limit applies at the band edges.

NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.

NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT.

4.4 Test Configuration

The configuration of the EUT and peripherals are same as those used in conducted emission test.

Please refer to Sec.3.4.

4.5 Operating Condition of EUT

Same as conducted emission test which is listed in Sec.3.5, except for the test setup replaced by Sec.4.2.

4.6 Test Procedures

The EUT and peripherals were placed on a FRP turntable that is 0.8 meter above ground. The FRP turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. Broadband antenna (Calibrated Bilog Antenna) was used as receiving antenna. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.4:2003 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESVS10 was set at 120 kHz

The frequency range from 30 MHz to 1000MHz was checked for all test modes.

The frequency range from 1 GHz to 2 GHz was checked for D-Sub/DVI 1680*1050@60Hz and D-Sub/DVI 1920*1080@60Hz modes.

The test modes were done on radiated disturbance test and all the test results are listed in Sec.4.7.

4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

M/N	Test Mode	Data Page
W2240TV	D-Sub 640*480@60Hz	P24
	D-Sub 1024*768@60Hz	P25
	D-Sub 1680*1050@60Hz	P26
	D-Sub 1920*1080@60Hz	P27
	DVI 640*480@60Hz	P28
	DVI 1024*768@60Hz	P29
	DVI 1680*1050@60Hz	P30
	DVI 1920*1080@60Hz	P31

NOTE 1 – **The bold test mode** listed above means the worst test mode.

NOTE 2 – Emission Level = Antenna Factor + Cable Loss + Meter Reading. (< 1GHz)

NOTE 3 – Emission Level = Antenna Factor + Cable Loss – Preamp Factor + Meter Reading. (> 1GHz)

NOTE 4 – The emission levels that are 20dB below the official limit are not reported.

NOTE 5 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 6 – The worst case is for DVI 1680*1050@60Hz test mode. The worst emission at horizontal polarization was detected at 222.060 MHz with corrected signal level of 35.31dB (μV/m) (limit is 46.00dB (μV/m)), when the antenna was 1.26 m height and the turntable was at 209°. The worst emission at vertical polarization was detected at 223.030MHz with corrected signal level of 41.35 dB (μV/m) (limit is 46.00 dB (μV/m)), when the antenna was 1.29 m height and the turntable was at 331°.

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 60%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 640*480@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	31.940	-0.09	18.49	0.62	19.02	40.00	20.98
	108.570	12.90	12.17	1.03	26.10	43.50	17.40
	160.950	15.24	10.48	1.30	27.02	43.50	16.48
	227.880	23.45	12.02	1.55	37.02	46.00	8.98
	429.640	11.81	16.92	2.08	30.81	46.00	15.19
	852.560	6.46	21.24	2.96	30.66	46.00	15.34
Vertical	32.910	12.84	17.95	0.62	31.41	40.00	8.59
	42.610	14.34	12.39	0.70	27.43	40.00	12.57
	227.880	25.19	12.02	1.55	38.76	46.00	7.24
	279.290	19.83	13.52	1.68	35.03	46.00	10.97
	429.640	16.88	16.92	2.08	35.88	46.00	10.12
	856.440	11.02	21.28	2.98	35.28	46.00	10.72

TEST ENGINEER: RAVEN JIN

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 60%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 1024*768@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	31.940	2.13	18.49	0.62	21.24	40.00	18.76
	106.630	16.95	12.02	1.08	30.05	43.50	13.45
	224.000	22.09	11.85	1.55	35.49	46.00	10.51
	292.870	12.21	13.79	1.75	27.75	46.00	18.25
	494.630	9.49	17.83	2.24	29.56	46.00	16.44
	876.810	6.25	21.49	3.01	30.75	46.00	15.25
Vertical	30.970	11.84	19.03	0.62	31.49	40.00	8.51
	41.640	13.79	13.02	0.70	27.51	40.00	12.49
	223.030	24.64	11.80	1.52	37.96	46.00	8.04
	279.290	19.75	13.52	1.68	34.95	46.00	11.05
	457.770	16.34	17.35	2.15	35.84	46.00	10.16
	890.390	10.89	21.60	3.03	35.52	46.00	10.48

TEST ENGINEER: RAVEN JIN

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 60%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 1680*1050@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	107.600	20.66	12.10	1.05	--	33.81	43.50	9.69	QP
	146.400	14.16	11.61	1.23	--	27.00	43.50	16.50	
	222.060	20.00	11.75	1.50	--	33.25	46.00	12.75	
	295.780	14.39	13.84	1.76	--	29.99	46.00	16.01	
	429.640	11.64	16.92	2.08	--	30.64	46.00	15.36	
	728.400	4.36	19.97	2.75	--	27.08	46.00	18.92	
	1114.000	46.41	23.21	4.00	34.11	39.51	74.00	34.49	PK
	1197.000	45.07	23.70	4.19	34.12	38.84	74.00	35.16	
	1284.000	44.27	24.36	4.37	34.13	38.87	74.00	35.13	
	1500.000	44.38	25.80	4.80	34.15	40.83	74.00	33.17	
	1635.000	43.76	26.49	5.06	34.16	41.15	74.00	32.85	
	1856.000	45.43	27.21	5.46	34.19	43.91	74.00	30.09	
Vertical	32.910	12.86	17.95	0.62	--	31.43	40.00	8.57	QP
	42.610	14.73	12.39	0.70	--	27.82	40.00	12.18	
	107.600	19.82	12.10	1.05	--	32.97	43.50	10.53	
	227.880	22.16	12.02	1.55	--	35.73	46.00	10.27	
	429.640	15.66	16.92	2.08	--	34.66	46.00	11.34	
	856.440	8.72	21.28	2.98	--	32.98	46.00	13.02	
	1058.000	42.80	22.79	3.85	34.10	35.34	74.00	38.66	PK
	1114.000	45.14	23.21	4.00	34.11	38.24	74.00	35.76	
	1211.000	42.62	23.82	4.22	34.12	36.54	74.00	37.46	
	1313.000	45.18	24.62	4.43	34.13	40.10	74.00	33.90	
	1499.000	42.06	25.80	4.80	34.15	38.51	74.00	35.49	
	1664.000	40.74	26.56	5.12	34.17	38.25	74.00	35.75	

TEST ENGINEER: RAVEN JIN

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 60%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 1920*1080@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	31.940	0.16	18.49	0.62	--	19.27	40.00	20.73	QP
	144.460	15.97	11.76	1.21	--	28.94	43.50	14.56	
	228.850	19.14	12.07	1.56	--	32.77	46.00	13.23	
	431.580	11.47	16.95	2.11	--	30.53	46.00	15.47	
	571.260	8.87	18.88	2.42	--	30.17	46.00	15.83	
	720.640	5.43	19.91	2.69	--	28.03	46.00	17.97	
	1157.000	46.37	23.48	4.10	34.11	39.84	74.00	34.16	PK
	1424.000	42.33	25.34	4.65	34.14	38.18	74.00	35.82	
	1500.000	41.38	25.80	4.80	34.15	37.83	74.00	36.17	
	1616.000	39.65	26.43	5.03	34.16	36.95	74.00	37.05	
	1739.000	36.50	26.76	5.27	34.18	34.35	74.00	39.65	
	1856.000	41.43	27.21	5.46	34.19	39.91	74.00	34.09	
Vertical	31.940	12.00	18.49	0.62	--	31.11	40.00	8.89	QP
	42.610	13.85	12.39	0.70	--	26.94	40.00	13.06	
	145.430	15.10	11.66	1.22	--	27.98	43.50	15.52	
	220.120	23.33	11.66	1.50	--	36.49	46.00	9.51	
	429.640	14.86	16.92	2.08	--	33.86	46.00	12.14	
	856.440	8.52	21.28	2.98	--	32.78	46.00	13.22	
	1054.000	45.76	22.76	3.83	34.10	38.25	74.00	35.75	PK
	1114.000	43.14	23.21	4.00	34.11	36.24	74.00	37.76	
	1211.000	45.62	23.82	4.22	34.12	39.54	74.00	34.46	
	1426.000	43.19	25.34	4.66	34.14	39.05	74.00	34.95	
	1628.000	39.40	26.47	5.05	34.16	36.76	74.00	37.24	
	1906.000	40.28	27.55	5.51	34.19	39.15	74.00	34.85	

TEST ENGINEER: RAVEN JIN

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 60%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : DVI 640*480@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	30.970	28.26	19.03	0.62	19.47	40.00	20.53
	155.130	42.53	10.89	1.28	26.85	43.50	16.65
	232.730	49.16	12.24	1.57	35.60	46.00	10.40
	325.850	38.55	14.62	1.85	27.38	46.00	18.62
	500.450	37.83	17.90	2.27	29.35	46.00	16.65
	908.820	35.31	21.76	3.06	31.38	46.00	14.62
Vertical	31.940	11.56	18.49	0.62	30.67	40.00	9.33
	41.640	14.65	13.02	0.70	28.37	40.00	11.63
	154.160	12.97	10.94	1.27	25.18	43.50	18.32
	226.910	26.07	11.98	1.55	39.60	46.00	6.40
	387.930	14.37	16.24	1.97	32.58	46.00	13.42
	856.440	9.90	21.28	2.98	34.16	46.00	11.84

TEST ENGINEER: RAVEN JIN

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 60%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : DVI 1024*768@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)
Horizontal	30.970	-0.88	19.03	0.62	18.77	40.00	21.23
	147.370	11.56	11.51	1.24	24.31	43.50	19.19
	224.000	24.29	11.85	1.55	37.69	46.00	8.31
	281.230	18.10	13.57	1.68	33.35	46.00	12.65
	429.640	9.68	16.92	2.08	28.68	46.00	17.32
	875.840	4.14	21.46	3.01	28.61	46.00	17.39
Vertical	32.910	11.48	17.95	0.62	30.05	40.00	9.95
	41.640	14.15	13.02	0.70	27.87	40.00	12.13
	219.150	26.16	11.57	1.50	39.23	46.00	6.77
	279.290	17.30	13.52	1.68	32.50	46.00	13.50
	429.640	15.56	16.92	2.08	34.56	46.00	11.44
	962.170	9.40	22.16	3.16	34.72	54.00	19.28

TEST ENGINEER: RAVEN JIN

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 60%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 1680*1050@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	31.940	0.42	18.49	0.62	--	19.53	40.00	20.47	QP
	115.360	6.91	12.71	1.12	--	20.74	43.50	22.76	
	164.830	12.77	10.35	1.31	--	24.43	43.50	19.07	
	222.060	22.06	11.75	1.50	--	35.31	46.00	10.69	
	324.880	13.86	14.58	1.85	--	30.29	46.00	15.71	
	457.770	8.79	17.35	2.15	--	28.29	46.00	17.71	
	1027.000	45.13	22.57	3.76	34.10	37.36	74.00	36.64	PK
	1083.000	44.78	22.98	3.91	34.11	37.56	74.00	36.44	
	1144.000	47.65	23.39	4.08	34.11	41.01	74.00	32.99	
	1498.000	42.50	25.80	4.80	34.15	38.95	74.00	35.05	
	1607.000	43.90	26.42	5.01	34.16	41.17	74.00	32.83	
	1794.000	38.90	26.88	5.39	34.18	36.99	74.00	37.01	
Vertical	32.910	11.80	17.95	0.62	--	30.37	40.00	9.63	QP
	42.610	14.09	12.39	0.70	--	27.18	40.00	12.82	
	223.030	28.03	11.80	1.52	--	41.35	46.00	4.65	
	279.290	18.03	13.52	1.68	--	33.23	46.00	12.77	
	429.640	15.74	16.92	2.08	--	34.74	46.00	11.26	
	844.800	8.17	21.16	2.95	--	32.28	46.00	13.72	
	1025.000	47.08	22.57	3.76	34.10	39.31	74.00	34.69	PK
	1104.000	46.91	23.15	3.97	34.11	39.92	74.00	34.08	
	1192.000	47.13	23.67	4.19	34.12	40.87	74.00	33.13	
	1316.000	41.60	24.62	4.44	34.13	36.53	74.00	37.47	
	1538.000	41.84	26.04	4.87	34.16	38.59	74.00	35.41	
	1637.000	43.00	26.49	5.07	34.16	40.40	74.00	33.60	

TEST ENGINEER: RAVEN JIN

EUT : LCD Monitor Temperature : 22°C

Model No. : W2240TV Humidity : 60%RH

Serial No. : E2009120803 Date of Test : Dec 29, 2009

Test Mode : D-Sub 1920*1080@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.970	0.06	19.03	0.62	--	19.71	40.00	20.29	QP
	221.090	20.84	11.71	1.50	--	34.05	46.00	11.95	
	296.750	17.86	13.86	1.76	--	33.48	46.00	12.52	
	446.130	14.86	17.17	2.11	--	34.14	46.00	11.86	
	676.990	7.23	19.59	2.64	--	29.46	46.00	16.54	
	891.360	14.49	21.63	3.02	--	39.14	46.00	6.86	
	1027.000	47.13	22.57	3.76	34.10	39.36	74.00	34.64	PK
	1144.000	48.65	23.39	4.08	34.11	42.01	74.00	31.99	
	1315.000	43.66	24.62	4.44	34.13	38.59	74.00	35.41	
	1374.000	40.49	25.05	4.56	34.14	35.96	74.00	38.04	
	1543.000	45.57	26.07	4.88	34.16	42.36	74.00	31.64	
	1750.000	44.00	26.78	5.30	34.18	41.90	74.00	32.10	
Vertical	33.880	11.68	17.44	0.64	--	29.76	40.00	10.24	QP
	41.640	14.63	13.02	0.70	--	28.35	40.00	11.65	
	217.210	23.49	11.48	1.49	--	36.46	46.00	9.54	
	279.290	18.19	13.52	1.68	--	33.39	46.00	12.61	
	395.690	13.91	16.40	1.98	--	32.29	46.00	13.71	
	891.360	13.97	21.63	3.02	--	38.62	46.00	7.38	
	1025.000	47.08	22.57	3.76	34.10	39.31	74.00	34.69	PK
	1070.000	45.02	22.88	3.87	34.11	37.66	74.00	36.34	
	1198.000	43.92	23.70	4.20	34.12	37.70	74.00	36.30	
	1303.000	43.49	24.54	4.42	34.13	38.32	74.00	35.68	
	1449.000	41.48	25.49	4.70	34.14	37.53	74.00	36.47	
	1575.000	41.73	26.26	4.95	34.16	38.78	74.00	35.22	

TEST ENGINEER: RAVEN JIN

5 DEVIATION TO TEST SPECIFICATIONS

None.

6 DEBUG DESCRIPTION

The following components are used during the countermeasure procedures:

Name	M/N	Specifications (mm)	Manufacturer	Location
Aluminum foil	T-308	50*30	DAEHUNG SUBSIDIARY MATERIALS.	See Internal Photo Figure 13
Sponge	MCQ57884405	75*10*4	EXPAN	See Internal Photo Figure 14

Note: We had required the applicant and manufacturer that all electrical and mechanical devices employed for spurious radiation suppression, including any modifications made during certification testing, must be incorporated in each unit marked

TEST ENGINEER:



(RAVEN JIN)