

Application for FCC Certificate
On Behalf of
Hisense Electric Co., Ltd.

LCD TV

Model No.	Serial No.	Brand
LTDN46V86US	E2010102804	Hisense

FCC ID : W9HLCDE0004

Prepared For : Hisense Electric Co., Ltd.
No.218 Qianwangang Road, Economy & Technology
Development Zone, Qingdao, China

Prepared By : Audix Technology (Shanghai) Co., Ltd.
3F 34Bldg 680 Guiping Rd,
Caohejing Hi-Tech Park,
Shanghai 200233, China

Tel: +86-21-64955500
Fax: +86-21-64955491

Report No. : ACI-F10158
Date of Test : Oct 29 – Nov 19, 2010
Date of Report : Nov 23, 2010

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TEST REPORT FOR FCC CERTIFICATE

Applicant : Hisense Electric Co., Ltd.
 Manufacturer : Hisense Electric Co., Ltd.
 EUT Description : LCD TV

Model No.	Serial No.	Brand	Power Supply
LTDN46V86US	E2010102804	Hisense	120V/60Hz

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 2009
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) 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: LTDN46V86US; S/N: E2010102804) which was tested in 3m anechoic chamber Oct 29 – Nov 19, 2010 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.

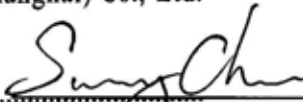
The test results for EUT's TV functions are contained in No.F10159, a Verification report.

Date of Test : Oct 29 – Nov 19, 2010 Date of Report : Nov 23, 2010

Producer : 
KATHY WANG / Assistant

Review : 
DIO YANG / Deputy Assistant Manager

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

Signatory : 
Authorized Signature EMC SAMMY CHEN / Deputy 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 2009 AND ANSI C63.4-2003	15.107(a) Class B	Pass
Radiated Disturbance	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2009 AND ANSI C63.4-2003	15.109(a) Class B	Pass

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description : LCD TV

Type of EUT : Production Pre-product Pro-type

Model No. : LTDN46V86US

Serial No. : E2010102804

Brand : Hisense

Applicant : Hisense Electric Co., Ltd.
No.218 Qianwangang Road, Economy &
Technology Development Zone, Qingdao, China

Manufacturer : Hisense Electric Co., Ltd.
No.218 Qianwangang Road, Economy &
Technology Development Zone, Qingdao, China

LCD Panel : Manufacturer : Samsung
M/N : LTA460HM05

Max Resolution : 1280*1024@60Hz

D-Sub Cable : Shielded, Detachable, 1.85m,
with two cores on cable

HDMI Cable : Shielded, Detachable, 1.85m,
without core on cable

Power Cord : Unshielded, Detachable, 1.80m

Remark:

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

Back Port:

- (1) One HDMI2 Port : Connected with DVD #1
- (2) One HDMI3 Port : Connected with DVD #2
- (3) One HDMI4 Port : Connected with DVD #3
- (4) One Digital Audio Out Port : Connected with DVD #3

Side Port

- (5) One HDMI1 Port : Connected with PC
- (6) One VGA Port : Connected with PC
- (7) One PC Audio In Port: : Connected with PC
- (8) One ANT Port : Connected with ATSC SG/TV SG
- (9) One Component of YPbPr Port : Connected with DVD #1
- (10) One Component of YPbPr Audio Port : Connected with DVD #1
- (11) One Component of AV Port : Connected with DVD #1
- (12) One Headphone Port : Connected with Earphone
- (13) One Service Port : Do not open to customer

2.2 Peripherals

2.2.1 PC

Manufacturer : HP
Model Number : dx7200MT
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 : KU-0459
Serial Number : 7691402450604
Data Cable : Shielded, Undetachable, 1.8m
Certificate : CE/EMC, FCC DoC, VCCI, MIC,
C-Tick, BSMI

2.2.4 Mouse

Manufacturer : DELL
Model Number : MO56UO
Serial Number : 443048231
Data Cable : Shielded, Undetachable, 1.8m.
Certificate : CE/EMC, FCC DoC, VCCI, MIC,
C-Tick, BSMI

2.2.5 Modem

Manufacturer : TP Link
Model Number : TM-EC5658V
Serial Number : 07123301053
Data Cable : Shielded, undetachable, 1.8m.
Certificate : CE/EMC, FCC DoC, VCCI, MIC, C-Tick,
BSMI

2.2.6 Earphone

Manufacturer : SONY
Model Number : MDR-E808
Serial Number : 1808030805305506

2.2.7 TV Signal Generator

Manufacturer : FLUKE
 Model Number : 54200m01
 Serial Number : 814008
 Data Cable : Shielded, detachable, 2.0m
 Power Cord : Unshielded, detachable, 2.0m
 Certificate : CE/EMC, FCC DoC, CCC

2.2.8 ATSC Signal Generator

Manufacturer : SENCORE
 Model Number : ATSC997
 Serial Number : 6790071

2.2.9 DVD #1

Manufacturer : PHILIPS
 Model Number : DVP3986K/93
 Serial Number : KX1A0902120108
 Certificate : FCC DoC, CE/EMC, CCC

2.2.10 DVD#2

Manufacturer : LG
 Model Number : DF9921N
 Serial Number : 3850R-M846W
 Certificate : FCC DoC, CE/EMC, CCC

2.2.11 DVD#3

Manufacturer : DGT RONIK
 Model Number : DV-A340
 Serial Number : 10004184-C
 Certificate : FCC DoC, CE/EMC, CCC

2.3 Description of Test Facility

Site Description (No.3 3m 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

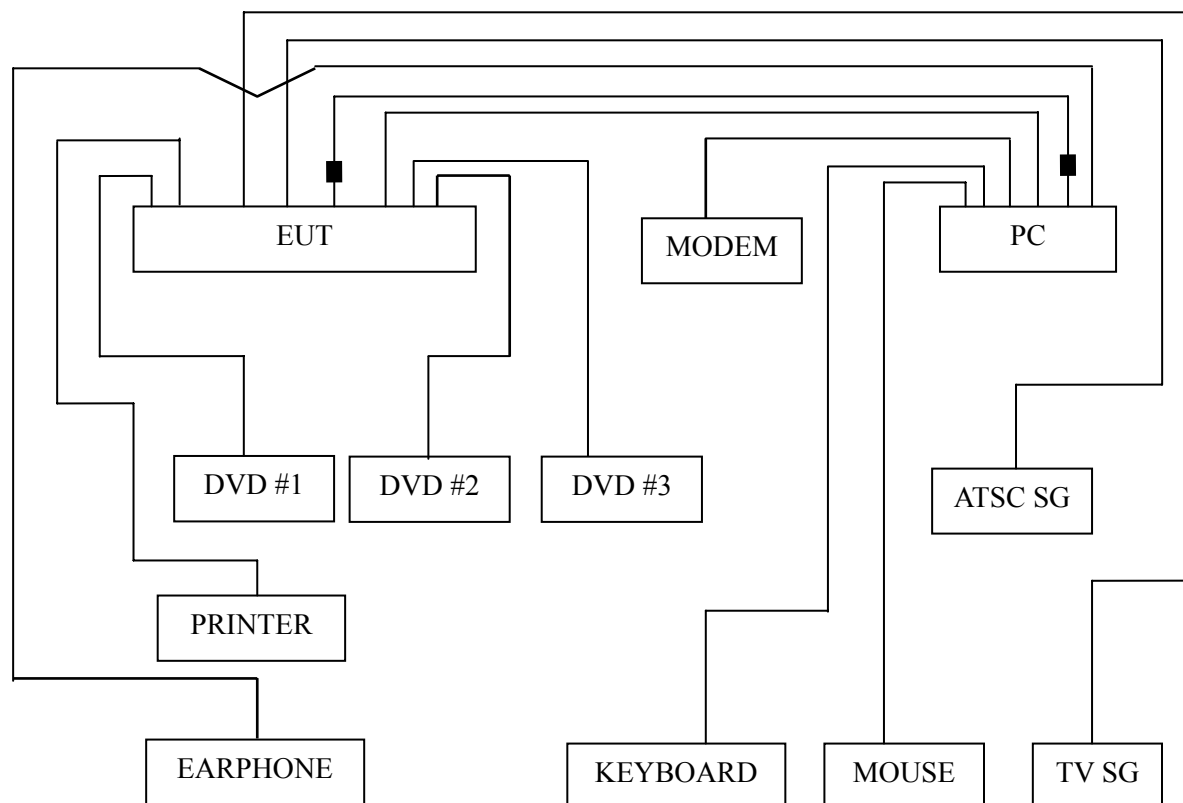
3.1 Test Equipment

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	Oct 15, 2010	Oct 15, 2011
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Apr 02, 2010	Apr 02, 2011
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Apr 02, 2010	Apr 02, 2011
4.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426389	Sep 19, 2010	Mar 19, 2011
5.	50 Ω Terminator	Anritsu	BNC	001	Apr 02, 2010	Apr 02, 2011
6.	Software	Audix	E3	SET00200 9804M592	--	--

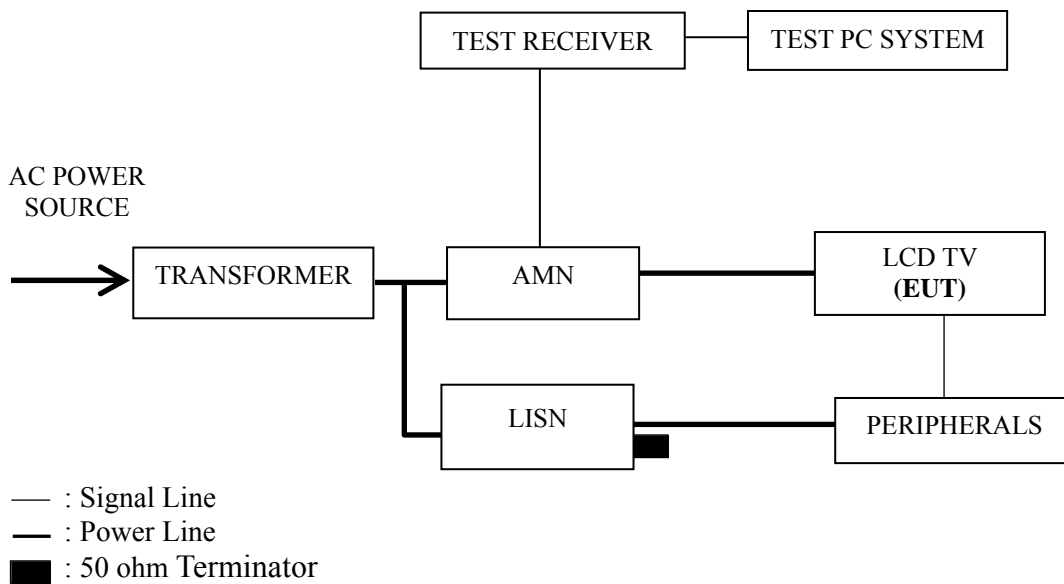
3.2 Block Diagram of Test Setup

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 & HDMI Input).

3.5.5 Repeat above procedure 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:

Test Mode
D-Sub 640*480@60Hz
D-Sub 800*600@60Hz
D-Sub 1280*1024@60Hz
HDMI 640*480@60Hz
HDMI 800*600@60Hz
HDMI 1280*1024@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.

Test Mode	Data Page
D-Sub 640*480@60Hz	P13
D-Sub 800*600@60Hz	P14
D-Sub 1280*1024@60Hz	P15
HDMI 640*480@60Hz	P16
HDMI 800*600@60Hz	P17
HDMI 1280*1024@60Hz	P18

NOTE 1 – Factor = Cable Loss + AMN Factor.

NOTE 2 – Emission Level = Meter Reading + Factor.

NOTE 3 – “QP” means “Quasi-Peak” values, “AV” means “Average” values.

NOTE 4 – The worst case is for HDMI 640*480@60Hz test mode. The worst emission is detected at 0.953 MHz (Quasi-Peak value) with corrected signal level of 50.79 dB (μ V) (limit is 56.00 dB (μ V)), when the Line of the EUT is connected to AMN.

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 48%RH

Serial No. : E2010102804 Date of Test : Oct 29, 2010

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

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.247	50.69	0.41	51.10	61.86	10.76	QP
	0.413	45.92	0.49	46.41	57.59	11.18	
	0.573	44.40	0.52	44.92	56.00	11.08	
	0.953	49.61	0.54	50.15	56.00	5.85	
	4.269	42.20	0.77	42.97	56.00	13.03	
	6.186	46.32	0.86	47.18	60.00	12.82	
	0.247	40.25	0.41	40.66	51.86	11.20	AV
	0.413	31.26	0.49	31.75	47.59	15.84	
	0.573	31.27	0.52	31.79	46.00	14.21	
	0.953	31.47	0.54	32.01	46.00	13.99	
	4.269	31.28	0.77	32.05	46.00	13.95	
	6.186	31.47	0.86	32.33	50.00	17.67	
Neutral	0.249	49.57	0.35	49.92	61.78	11.86	QP
	0.408	46.96	0.44	47.40	57.68	10.28	
	0.914	49.06	0.51	49.57	56.00	6.43	
	0.984	45.73	0.51	46.24	56.00	9.76	
	4.574	41.27	0.72	41.99	56.00	14.01	
	6.698	47.15	0.85	48.00	60.00	12.00	
	0.249	32.57	0.35	32.92	51.78	18.86	AV
	0.408	32.57	0.44	33.01	47.68	14.67	
	0.914	32.57	0.51	33.08	46.00	12.92	
	0.984	32.47	0.51	32.98	46.00	13.02	
	4.574	31.57	0.72	32.29	46.00	13.71	
	6.698	32.47	0.85	33.32	50.00	16.68	

TEST ENGINEER: WENCY YANG

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 48%RH

Serial No. : E2010102804 Date of Test : Oct 29, 2010

Test Mode : D-Sub 800*600@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.249	50.96	0.42	51.38	61.78	10.40	QP
	0.408	46.80	0.48	47.28	57.68	10.40	
	0.579	45.28	0.52	45.80	56.00	10.20	
	0.963	49.57	0.54	50.11	56.00	5.89	
	4.269	42.04	0.77	42.81	56.00	13.19	
	6.698	47.38	0.88	48.26	60.00	11.74	
	0.249	40.25	0.42	40.67	51.78	11.11	AV
	0.408	31.26	0.48	31.74	47.68	15.94	
	0.579	31.25	0.52	31.77	46.00	14.23	
	0.963	31.54	0.54	32.08	46.00	13.92	
	4.269	31.26	0.77	32.03	46.00	13.97	
	6.698	32.17	0.88	33.05	50.00	16.95	
Neutral	0.249	50.58	0.35	50.93	61.78	10.85	QP
	0.408	46.85	0.44	47.29	57.68	10.39	
	0.579	42.81	0.49	43.30	56.00	12.70	
	0.963	50.00	0.51	50.51	56.00	5.49	
	4.269	42.88	0.71	43.59	56.00	12.41	
	6.698	46.77	0.85	47.62	60.00	12.38	
	0.249	40.23	0.35	40.58	51.78	11.20	AV
	0.408	31.26	0.44	31.70	47.68	15.98	
	0.579	31.26	0.49	31.75	46.00	14.25	
	0.963	31.47	0.51	31.98	46.00	14.02	
	4.269	31.57	0.71	32.28	46.00	13.72	
	6.698	31.50	0.85	32.35	50.00	17.65	

TEST ENGINEER: WENCY YANG

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 48%RH

Serial No. : E2010102804 Date of Test : Oct 29, 2010

Test Mode : D-Sub 1280*1024@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.249	51.47	0.42	51.89	61.78	9.89	QP
	0.413	46.20	0.49	46.69	57.59	10.90	
	0.579	44.38	0.52	44.90	56.00	11.10	
	0.953	48.63	0.54	49.17	56.00	6.83	
	4.407	42.53	0.77	43.30	56.00	12.70	
	6.698	47.07	0.88	47.95	60.00	12.05	
	0.249	41.25	0.42	41.67	51.78	10.11	AV
	0.413	31.47	0.49	31.96	47.59	15.63	
	0.579	31.27	0.52	31.79	46.00	14.21	
	0.953	32.15	0.54	32.69	46.00	13.31	
	4.407	31.25	0.77	32.02	46.00	13.98	
	6.698	32.57	0.88	33.45	50.00	16.55	
Neutral	0.249	50.86	0.35	51.21	61.78	10.57	QP
	0.408	46.77	0.44	47.21	57.68	10.47	
	0.579	43.94	0.49	44.43	56.00	11.57	
	0.963	49.55	0.51	50.06	56.00	5.94	
	4.269	42.60	0.71	43.31	56.00	12.69	
	6.698	47.62	0.85	48.47	60.00	11.53	
	0.249	40.21	0.35	40.56	51.78	11.22	AV
	0.408	31.26	0.44	31.70	47.68	15.98	
	0.579	33.14	0.49	33.63	46.00	12.37	
	0.963	31.24	0.51	31.75	46.00	14.25	
	4.269	31.54	0.71	32.25	46.00	13.75	
	6.698	32.17	0.85	33.02	50.00	16.98	

TEST ENGINEER: WENCY YANG

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 48%RH

Serial No. : E2010102804 Date of Test : Oct 29, 2010

Test Mode : HDMI 640*480@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.249	51.75	0.42	52.17	61.78	9.61	QP
	0.413	46.24	0.49	46.73	57.59	10.86	
	0.579	45.06	0.52	45.58	56.00	10.42	
	0.953	50.25	0.54	50.79	56.00	5.21	
	4.269	41.49	0.77	42.26	56.00	13.74	
	6.352	46.47	0.86	47.33	60.00	12.67	
	AV	0.249	41.22	0.42	41.64	51.78	10.14
		0.413	32.25	0.49	32.74	47.59	14.85
		0.579	31.25	0.52	31.77	46.00	14.23
		0.953	38.26	0.54	38.80	46.00	7.20
		4.269	30.26	0.77	31.03	46.00	14.97
		6.352	32.46	0.86	33.32	50.00	16.68
Neutral	0.249	51.31	0.35	51.66	61.78	10.12	QP
	0.413	47.44	0.45	47.89	57.59	9.70	
	0.579	45.58	0.49	46.07	56.00	9.93	
	0.909	46.40	0.51	46.91	56.00	9.09	
	4.574	43.14	0.72	43.86	56.00	12.14	
	6.352	46.89	0.82	47.71	60.00	12.29	
	AV	0.249	41.23	0.35	41.58	51.78	10.20
		0.413	31.26	0.45	31.71	47.59	15.88
		0.579	32.45	0.49	32.94	46.00	13.06
		0.909	31.26	0.51	31.77	46.00	14.23
		4.574	31.26	0.72	31.98	46.00	14.02
		6.352	32.16	0.82	32.98	50.00	17.02

TEST ENGINEER: WENCY YANG

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 48%RH

Serial No. : E2010102804 Date of Test : Oct 29, 2010

Test Mode : HDMI 800*600@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.249	51.80	0.42	52.22	61.78	9.56	QP
	0.413	42.51	0.49	43.00	57.59	14.59	
	0.579	44.28	0.52	44.80	56.00	11.20	
	0.914	49.77	0.54	50.31	56.00	5.69	
	4.269	42.64	0.77	43.41	56.00	12.59	
	6.352	47.06	0.86	47.92	60.00	12.08	
	0.249	41.35	0.42	41.77	51.78	10.01	AV
	0.413	32.54	0.49	33.03	47.59	14.56	
	0.579	31.24	0.52	31.76	46.00	14.24	
	0.914	31.24	0.54	31.78	46.00	14.22	
	4.269	31.57	0.77	32.34	46.00	13.66	
	6.352	31.29	0.86	32.15	50.00	17.85	
Neutral	0.249	51.23	0.35	51.58	61.78	10.20	QP
	0.413	47.08	0.45	47.53	57.59	10.06	
	0.579	45.19	0.49	45.68	56.00	10.32	
	0.953	49.39	0.51	49.90	56.00	6.10	
	4.407	43.50	0.72	44.22	56.00	11.78	
	7.687	47.66	0.90	48.56	60.00	11.44	
	0.249	41.23	0.35	41.58	51.78	10.20	AV
	0.413	32.18	0.45	32.63	47.59	14.96	
	0.579	32.54	0.49	33.03	46.00	12.97	
	0.953	31.47	0.51	31.98	46.00	14.02	
	4.407	33.21	0.72	33.93	46.00	12.07	
	7.687	31.47	0.90	32.37	50.00	17.63	

TEST ENGINEER: WENCY YANG

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 48%RH

Serial No. : E2010102804 Date of Test : Oct 29, 2010

Test Mode : HDMI 1280*1024@60Hz

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.249	51.53	0.42	51.95	61.78	9.83	QP
	0.413	46.14	0.49	46.63	57.59	10.96	
	0.579	45.60	0.52	46.12	56.00	9.88	
	0.953	50.08	0.54	50.62	56.00	5.38	
	4.202	42.35	0.77	43.12	56.00	12.88	
	7.025	46.83	0.89	47.72	60.00	12.28	
	0.249	41.25	0.42	41.67	51.78	10.11	AV
	0.413	32.65	0.49	33.14	47.59	14.45	
	0.579	32.15	0.52	32.67	46.00	13.33	
	0.953	38.15	0.54	38.69	46.00	7.31	
	4.202	32.57	0.77	33.34	46.00	12.66	
	7.025	32.57	0.89	33.46	50.00	16.54	
Neutral	0.249	51.13	0.35	51.48	61.78	10.30	QP
	0.413	46.12	0.45	46.57	57.59	11.02	
	0.579	43.48	0.49	43.97	56.00	12.03	
	0.963	49.80	0.51	50.31	56.00	5.69	
	4.269	43.33	0.71	44.04	56.00	11.96	
	6.352	47.56	0.82	48.38	60.00	11.62	
	0.249	41.26	0.35	41.61	51.78	10.17	AV
	0.413	32.58	0.45	33.03	47.59	14.56	
	0.579	33.24	0.49	33.73	46.00	12.27	
	0.963	33.24	0.51	33.75	46.00	12.25	
	4.269	33.24	0.71	33.95	46.00	12.05	
	6.352	33.27	0.82	34.09	50.00	15.91	

TEST ENGINEER: WENCY YANG

4 RADIATED EMISSION TEST

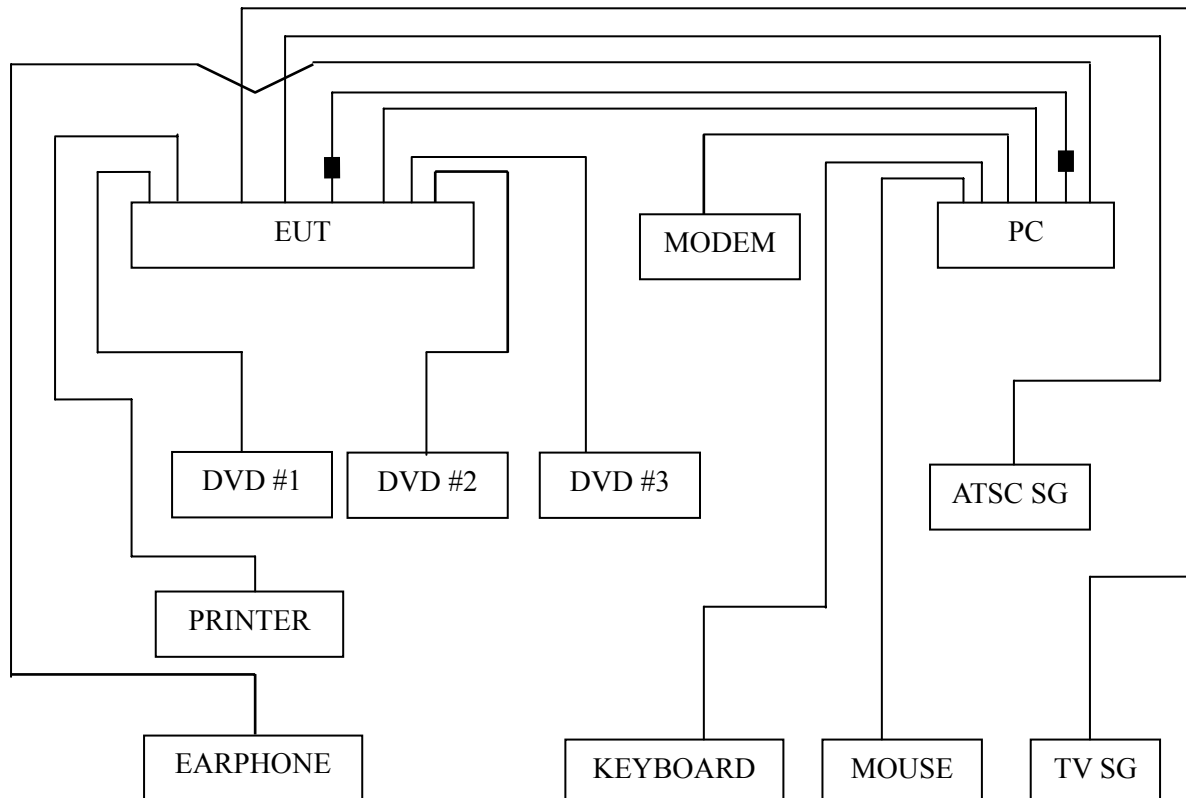
4.1 Test Equipment

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, 2010	Mar 07, 2011
2.	Preamplifier	Agilent	8447D	2944A10548	Sep 19, 2010	Mar 19, 2011
3.	Preamplifier	HP	8449B	3008A00864	Apr 29, 2010	Apr 29, 2011
4.	Bi-log Antenna	TESEQ	CBL6112D	23192	Dec 01, 2009	Dec 01, 2010
5.	Spectrum Analyzer	Agilent	E7405A	MY45106600	May 19, 2010	May 19, 2011
6.	Software	Audix	E3	SET00200 9912M295-2	--	--

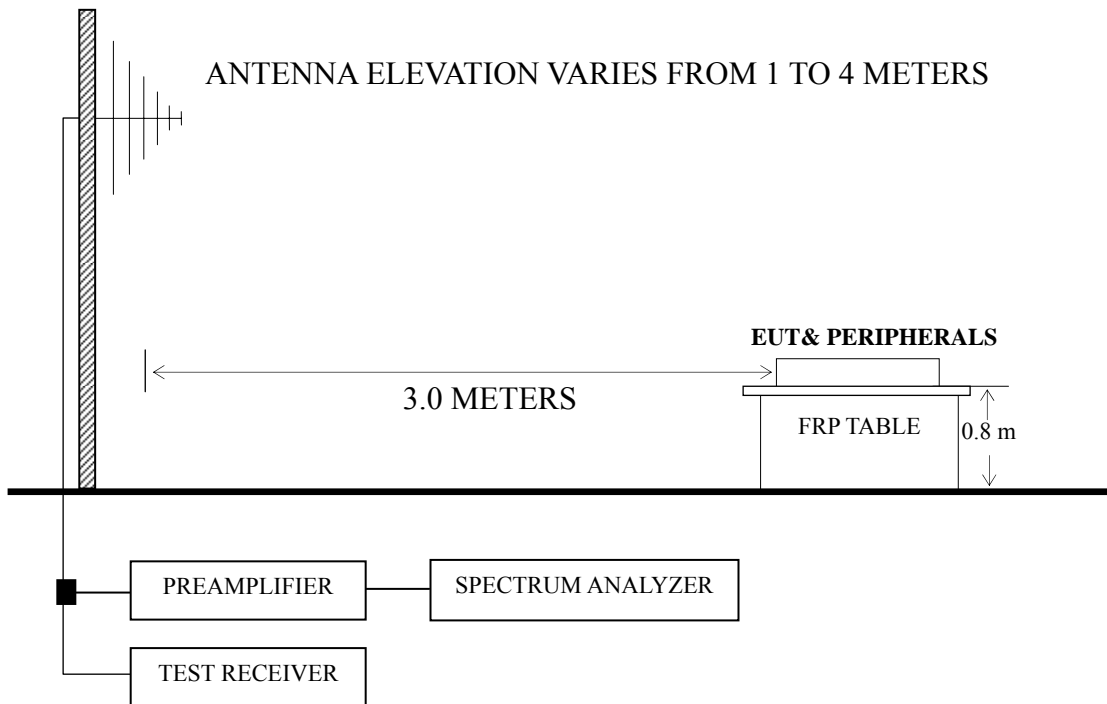
4.2 Block Diagram of Test Setup

4.2.1 EUT and Peripherals



■ : Ferrite core

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.

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 I.F. bandwidth of Test Receiver R&S ESVS10 was set at 120 kHz below 1GHz and The Spectrum Agilent E7405A was set at 1MHz above 1GHz.

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/HDMI 1280*1024@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.

Test Mode	Data Page
D-Sub 640*480@60Hz	P23
D-Sub 800*600@60Hz	P24
D-Sub 1280*1024@60Hz	P25 – P26
HDMI 640*480@60Hz	P27
HDMI 800*600@60Hz	P28
HDMI 1280*1024@60Hz	P29 – P30

- NOTE 1 – Emission Level = Antenna Factor + Cable Loss + Meter Reading. (< 1GHz)
- NOTE 2 – Emission Level = Antenna Factor + Cable Loss – Preamp Factor + Meter Reading. (> 1GHz)
- NOTE 3 – All readings are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.
- NOTE 4 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.
- NOTE 5 – The worst case is for D-Sub 1280*1024@60Hz test mode. The worst emission at horizontal polarization was detected at 143.490 MHz with corrected signal level of 40.29 dB ($\mu\text{V}/\text{m}$) (limit is 43.50 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.00 m height and the turntable was at 60°. The worst emission at vertical polarization was detected at 167.740 MHz with corrected signal level of 40.93 dB ($\mu\text{V}/\text{m}$) (limit is 43.50 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.00 m height and the turntable was at 350°.

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 60%RH

Serial No. : E2010102804 Date of Test : Nov 19, 2010

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

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	58.130	25.15	6.96	0.83	32.94	40.00	7.06
	130.880	26.43	12.47	1.18	40.08	43.50	3.42
	155.130	27.47	10.89	1.26	39.62	43.50	3.88
	371.440	21.43	15.88	1.99	39.30	46.00	6.70
	681.840	16.30	19.62	2.63	38.55	46.00	7.45
	877.780	12.89	21.49	3.00	37.38	46.00	8.62
Vertical	94.990	25.78	10.45	1.02	37.25	43.50	6.25
	119.240	22.36	12.97	1.12	36.45	43.50	7.05
	130.880	24.44	12.47	1.18	38.09	43.50	5.41
	252.130	24.27	12.94	1.61	38.82	46.00	7.18
	373.380	21.39	15.92	1.99	39.30	46.00	6.70
		877.780	16.72	21.49	3.00	41.21	46.00

TEST ENGINEER: RAVEN JIN

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 60%RH

Serial No. : E2010102804 Date of Test : Nov 19, 2010

Test Mode : D-Sub 800*600@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	58.130	24.47	6.96	0.83	32.26	40.00	7.74
	82.380	24.21	8.19	0.96	33.36	40.00	6.64
	130.880	25.57	12.47	1.18	39.22	43.50	4.28
	155.130	27.31	10.89	1.26	39.46	43.50	4.04
	221.090	25.91	11.71	1.52	39.14	46.00	6.86
	373.380	21.36	15.92	1.99	39.27	46.00	6.73
Vertical	48.430	25.82	9.62	0.77	36.21	40.00	3.79
	119.240	21.97	12.97	1.12	36.06	43.50	7.44
	130.880	22.38	12.47	1.18	36.03	43.50	7.47
	155.130	25.24	10.89	1.26	37.39	43.50	6.11
	252.130	21.32	12.94	1.61	35.87	46.00	10.13
	877.780	15.82	21.49	3.00	40.31	46.00	5.69

TEST ENGINEER: RAVEN JIN

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 60%RH

Serial No. : E2010102804 Date of Test : Nov 19, 2010

Test Mode : D-Sub 1280*1024@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	58.130	27.16	6.96	0.83	--	34.95	40.00	5.05	QP
	71.000	29.10	6.61	0.90	--	36.61	40.00	3.39	
	143.490	27.26	11.81	1.22	--	40.29	43.50	3.21	
	293.840	23.35	13.79	1.74	--	38.88	46.00	7.12	
	339.430	16.71	15.03	1.88	--	33.62	46.00	12.38	
	371.440	14.84	15.88	1.99	--	32.71	46.00	13.29	
	1019.000	45.18	24.98	4.49	37.36	37.29	74.00	36.71	PK
	1167.000	45.67	25.64	4.51	37.08	38.74	74.00	35.26	
	1394.000	44.49	26.69	4.54	36.55	39.17	74.00	34.83	
	1624.000	45.01	27.10	4.56	36.06	40.61	74.00	33.39	
	1792.000	47.22	27.26	4.58	35.82	43.24	74.00	30.76	
	1992.000	47.62	27.39	4.78	35.61	44.18	74.00	29.82	AV
	1019.000	32.64	24.98	4.49	37.36	24.75	54.00	29.25	
	1167.000	34.54	25.64	4.51	37.08	27.61	54.00	26.39	
	1394.000	29.64	26.69	4.54	36.55	24.32	54.00	29.68	
	1624.000	31.69	27.10	4.56	36.06	27.29	54.00	26.71	
1792.000	31.96	27.26	4.58	35.82	27.98	54.00	26.02		
1992.000	38.95	27.39	4.78	35.61	35.51	54.00	18.49		

TEST ENGINEER: RAVEN JIN

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 60%RH

Serial No. : E2010102804 Date of Test : Nov 19, 2010

Test Mode : D-Sub 1280*1024@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Vertical	71.000	28.98	6.61	0.90	--	36.49	40.00	3.51	QP
	167.740	29.34	10.27	1.32	--	40.93	43.50	2.57	
	252.130	23.02	12.94	1.61	--	37.57	46.00	8.43	
	293.840	22.97	13.79	1.74	--	38.50	46.00	7.50	
	371.440	23.45	15.88	1.99	--	41.32	46.00	4.68	
	877.780	16.59	21.49	3.00	--	41.08	46.00	4.92	
	1039.000	46.41	25.06	4.49	37.33	38.63	74.00	35.37	PK
	1174.000	46.16	25.69	4.51	37.06	39.30	74.00	34.70	
	1447.000	45.68	26.86	4.55	36.42	40.67	74.00	33.33	
	1562.000	44.86	27.05	4.56	36.17	40.30	74.00	33.70	
	1762.000	46.15	27.23	4.58	35.86	42.10	74.00	31.90	
	1994.000	48.67	27.40	4.78	35.61	45.24	74.00	28.76	
	1039.000	29.65	25.06	4.49	37.33	21.87	54.00	32.13	AV
	1174.000	36.25	25.69	4.51	37.06	29.39	54.00	24.61	
	1447.000	28.56	26.86	4.55	36.42	23.55	54.00	30.45	
	1562.000	29.64	27.05	4.56	36.17	25.08	54.00	28.92	
	1762.000	31.27	27.23	4.58	35.86	27.22	54.00	26.78	
	1994.000	29.54	27.40	4.78	35.61	26.11	54.00	27.89	

TEST ENGINEER: RAVEN JIN

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 60%RH

Serial No. : E2010102804 Date of Test : Nov 19, 2010

Test Mode : HDMI 640*480@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	41.640	14.82	13.02	0.73	28.57	40.00	11.43
	57.160	15.38	7.18	0.83	23.39	40.00	16.61
	87.230	21.42	8.96	0.98	31.36	40.00	8.64
	221.090	14.72	11.71	1.52	27.95	46.00	18.05
	527.610	11.02	18.27	2.32	31.61	46.00	14.39
	588.720	10.88	19.09	2.43	32.40	46.00	13.60
Vertical	74.620	21.22	7.11	0.92	29.25	40.00	10.75
	129.910	16.46	12.52	1.17	30.15	43.50	13.35
	155.130	22.59	10.89	1.26	34.74	43.50	8.76
	342.340	18.00	15.11	1.90	35.01	46.00	10.99
	589.690	14.40	19.09	2.43	35.92	46.00	10.08
	683.780	16.04	19.62	2.65	38.31	46.00	7.69

TEST ENGINEER: RAVEN JIN

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 60%RH

Serial No. : E2010102804 Date of Test : Nov 19, 2010

Test Mode : HDMI 800*600@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	74.620	20.35	7.11	0.92	28.38	40.00	11.62
	129.910	19.69	12.52	1.17	33.38	43.50	10.12
	293.840	18.67	13.79	1.74	34.20	46.00	11.80
	341.370	18.73	15.07	1.90	35.70	46.00	10.30
	589.690	16.59	19.09	2.43	38.11	46.00	7.89
	687.660	16.15	19.65	2.65	38.45	46.00	7.55
Vertical	30.000	17.00	19.60	0.63	37.23	40.00	2.77
	32.000	17.20	18.49	0.65	36.34	40.00	3.66
	75.590	24.67	7.24	0.92	32.83	40.00	7.17
	148.340	19.89	11.41	1.23	32.53	43.50	10.97
	294.810	21.14	13.82	1.76	36.72	46.00	9.28
	687.400	18.20	19.65	2.65	40.50	46.00	5.50

TEST ENGINEER: RAVEN JIN

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 60%RH

Serial No. : E2010102804 Date of Test : Nov 19, 2010

Test Mode : HDMI 1280*1024@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	82.380	26.20	8.19	0.96	--	35.35	40.00	4.65	QP
	130.880	24.68	12.47	1.18	--	38.33	43.50	5.17	
	143.000	27.10	11.86	1.22	--	40.18	43.50	3.32	
	371.440	23.93	15.88	1.99	--	41.80	46.00	4.20	
	681.840	18.31	19.62	2.63	--	40.56	46.00	5.44	
	904.940	17.15	21.73	3.04	--	41.92	46.00	4.08	
	1024.000	46.03	25.00	4.49	37.36	38.16	74.00	35.84	PK
	1174.000	46.14	25.69	4.51	37.06	39.28	74.00	34.72	
	1444.000	46.21	26.84	4.55	36.42	41.18	74.00	32.82	
	1594.000	44.24	27.07	4.56	36.11	39.76	74.00	34.24	
	1762.000	45.14	27.23	4.58	35.86	41.09	74.00	32.91	
	1992.000	48.98	27.39	4.78	35.61	45.54	74.00	28.46	
	1024.000	37.95	25.00	4.49	37.36	30.08	54.00	23.92	AV
	1174.000	32.84	25.69	4.51	37.06	25.98	54.00	28.02	
	1444.000	29.54	26.84	4.55	36.42	24.51	54.00	29.49	
	1594.000	31.25	27.07	4.56	36.11	26.77	54.00	27.23	
	1762.000	29.68	27.23	4.58	35.86	25.63	54.00	28.37	
	1992.000	29.69	27.39	4.78	35.61	26.25	54.00	27.75	

TEST ENGINEER: RAVEN JIN

EUT : LCD TV Temperature : 22°C

Model No. : LTDN46V86US Humidity : 60%RH

Serial No. : E2010102804 Date of Test : Nov 19, 2010

Test Mode : HDMI 1280*1024@60Hz

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Vertical	32.910	18.04	17.95	0.66	--	36.65	40.00	3.35	QP
	70.740	27.78	6.58	0.90	--	35.26	40.00	4.74	
	130.880	21.46	12.47	1.18	--	35.11	43.50	8.39	
	179.380	26.79	9.92	1.37	--	38.08	43.50	5.42	
	371.440	15.87	15.88	1.99	--	33.74	46.00	12.26	
	901.060	18.17	21.70	3.04	--	42.91	46.00	3.09	
	1057.000	45.11	25.13	4.50	37.29	37.45	74.00	36.55	PK
	1174.000	45.62	25.69	4.51	37.06	38.76	74.00	35.24	
	1447.000	46.49	26.86	4.55	36.42	41.48	74.00	32.52	
	1597.000	45.65	27.08	4.56	36.10	41.19	74.00	32.81	
	1792.000	45.31	27.26	4.58	35.82	41.33	74.00	32.67	
	1995.000	47.06	27.40	4.78	35.61	43.63	74.00	30.37	
	1057.000	35.64	25.13	4.50	37.29	27.98	54.00	26.02	AV
	1174.000	34.65	25.69	4.51	37.06	27.79	54.00	26.21	
	1447.000	31.28	26.86	4.55	36.42	26.27	54.00	27.73	
	1597.000	31.29	27.08	4.56	36.10	26.83	54.00	27.17	
	1792.000	29.63	27.26	4.58	35.82	25.65	54.00	28.35	
	1995.000	31.29	27.40	4.78	35.61	27.86	54.00	26.14	

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	Manufacturer	Location
Ferrite core	ZCAT3035-1330\ROH	Qingdao Joinset S&T Co., Ltd.	See Internal Photos Figure 17
		JIANGSU LETTALL ELECTRONICS Co., LTD.	
		TAT ELECTRONIC TECH CO.,LTD.	
		Qingdao Joinset S&T Co., Ltd.	
Ferrite core	BNF-12\ZCAT1519-0830\ROH	Qingdao Joinset S&T Co., Ltd.	See Internal Photos Figure 18
		JIANGSU LETTALL ELECTRONICS Co., LTD.	
		TAT ELECTRONIC TECH CO.,LTD.	
Gasket	35X0.7X41mm\VGA\ROH	Qingdao Joinset S&T Co., Ltd.	See Internal Photos Figure 19

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)