

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

LED LCD TV

Model No.	Brand
LHD23A300US	Hisense
23A320	

FCC ID : W9HLCDA0007

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

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Report No. : ACI-F13181
Date of Test : Oct 16 – 18, 2013
Date of Report : Oct 23, 2013

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TEST REPORT FOR FCC CERTIFICATE

Applicant : Hisense Electric Co., Ltd.
 Manufacturer : Hisense Electric Co., Ltd.
 Factory #1 : Hisense Electric Co., Ltd.
 Factory #2 : Tatung Mexico S.A. de C.V.
 EUT Description : LED LCD TV

Model No.	Brand	Power Supply
LHD23A300US	Hisense	120V/60Hz
23A320		

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 2012
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: Refer to Sec2.1) which was tested in 3m anechoic chamber Oct 16 – 18, 2013 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.

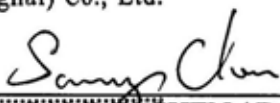
The test results for EUT's TV functions are contained in No.F13180, a Verification report.

Date of Test : Oct 16 – 18, 2013 Date of Report : Oct 23, 2013

Producer : 
 EMILY ZHU / Assistant

Review : 
 DIO YANG / 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 2012 AND ANSI C63.4-2003	15.107(a) Class B	Pass
Radiated Disturbance	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2012 AND ANSI C63.4-2003	15.109(a) Class B	Pass

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description	:	LED LCD TV
Type of EUT	:	<input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-product <input type="checkbox"/> Pro-type
Model No.	:	LHD23A300US, 23A320
Brand Name	:	Hisense
Note	:	The above models are all the same except for the model name. LHD23A300US model was tested and recorded in the report.
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
Factory #1	:	Hisense Electric Co., Ltd. No.218 Qianwangang Road, Economy & Technology Development Zone, Qingdao, China
Factory #2	:	Tatung Mexico S.A. de C.V. Miguel Catalán 420, Parque Industrial Rio Bravo, Cd. Juarez, Chih., CP 32557
LCD Panel	:	Manufacturer : SAMSUNG M/N : LTA230AN01
Max Resolution	:	1920*1080@60Hz (HDMI) 1024*768@60Hz (D-Sub)
D-Sub Cable	:	Shielded, Detachable, 1.85m, with two cores on cable
HDMI Cable	:	Shielded, Detachable, 1.00m
Power Cord	:	Unshielded, Detachable, 1.80m

Remark:

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

Bottom Port:

- (1) One HDMI Port : Connected with PC
- (2) One USB Port : Connected with U-Disk
- (3) One AV/ COMPONENT IN Port : Connected with DVD PLAYER

Side Port:

- (1) One DIGITAL AUDIO OUT : Connected with DVD PLAYER
- (2) One VGA Port : Connected with PC
- (3) One PC AUDIO Port : Connected with PC
- (4) One ANT /Cable in Port : Connected with ATSC SG / TV SG
- (5) One AUDIO OUT Port : Connected with Earphone

2.2 Peripherals

2.2.1 PC

Manufacturer : HP
 Model Number : dx7200MT
 Serial Number : CNG622017W
 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, 1.8m.
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, Detachable, 1.8m
Certificate : FCC DoC, CE/EMC, CCC

2.2.6 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

2.2.7 ATSC Signal Generator

Manufacturer : SENCORE
Model Number : ATSC997
Serial Number : 6790071

2.2.8 DVD PLAYER

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

2.2.9 Earphone

Manufacturer : Skullcandy
Model Number : FMJ

2.2.10 U-DISK

Manufacturer : LG
Model Number : 1GB

2.3 Description of Test Facility

Site Description (No.3 3m Chamber)	:	Sept. 17, 1998 file on Mar 16, 2012 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 = 3.02 dB
Radiated Emission Expanded Uncertainty (30-200MHz):	U = 4.17 dB (Horizontal) U = 4.02 dB (Vertical)
Radiated Emission Expanded Uncertainty (200M-1GHz):	U = 3.38 dB (Horizontal) U = 3.28 dB (Vertical)
Radiated Emission Expanded Uncertainty (Above 1GHz):	U = 4.68 dB (Horizontal) U = 4.87 dB (Vertical)

3 CONDUCTED EMISSION TEST

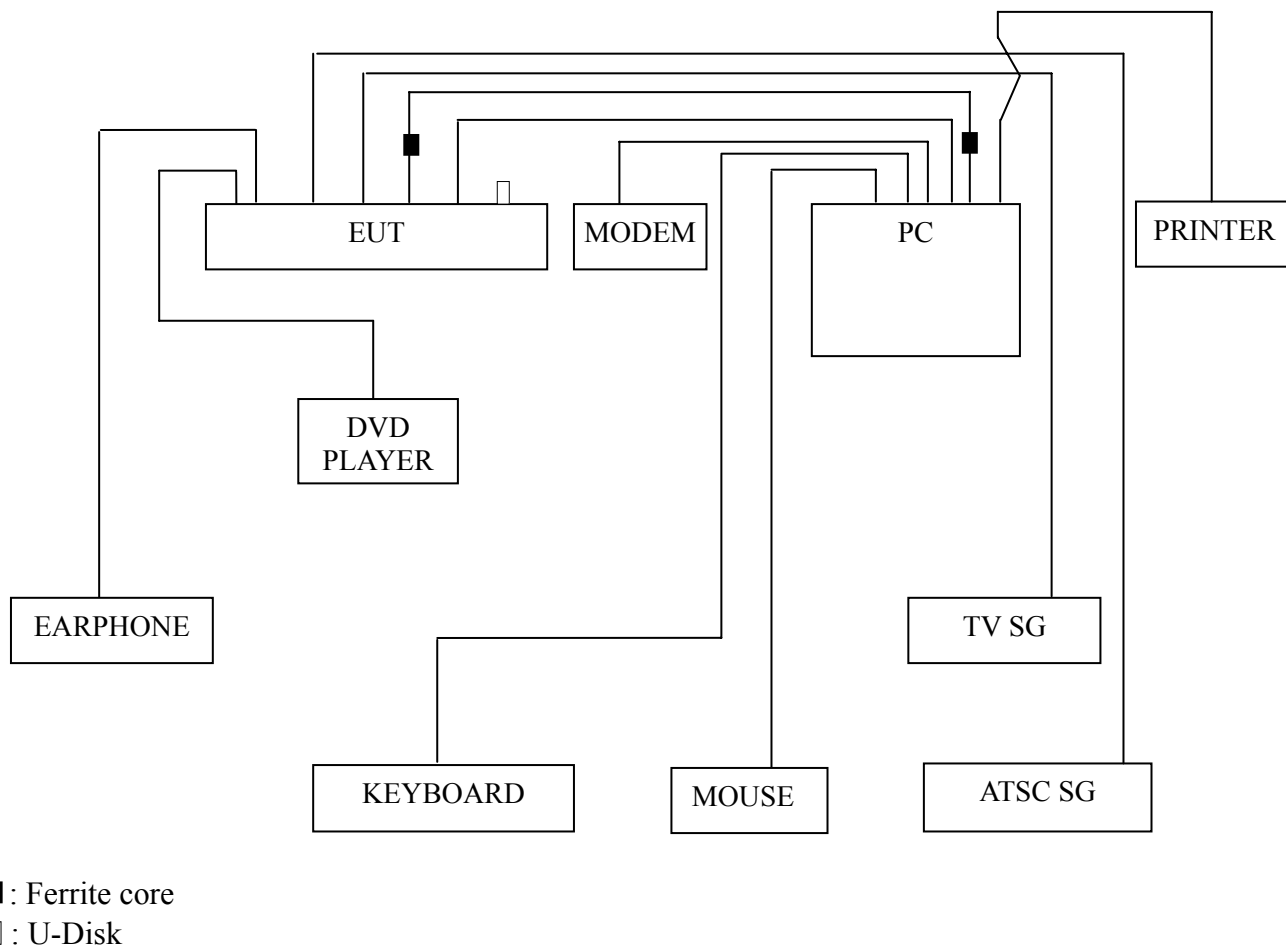
3.1 Test Equipment

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

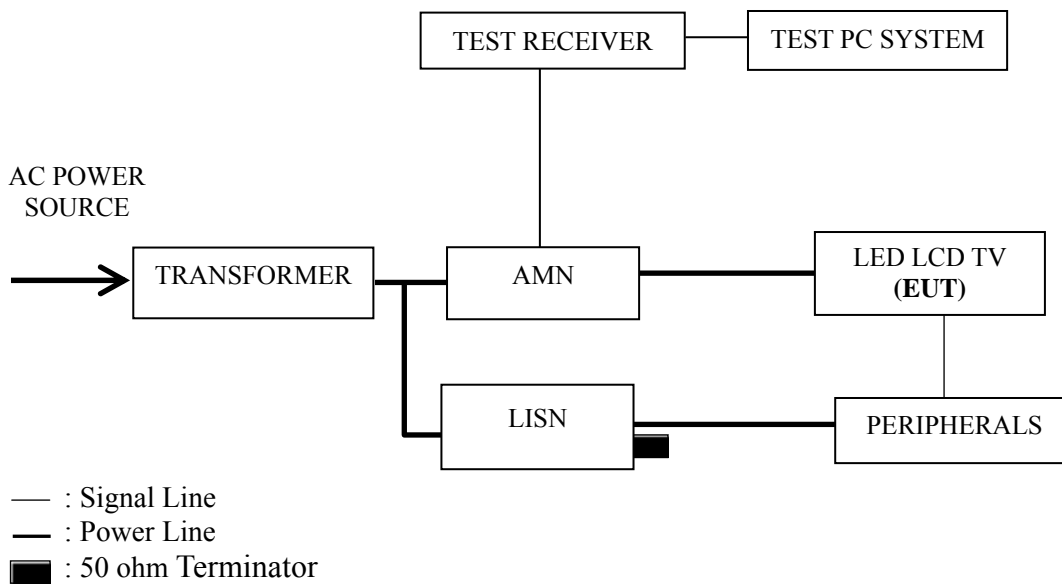
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Mar 20, 2013	Mar 19, 2014
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 25, 2013	Feb 24, 2014
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 20, 2013	Mar 19, 2014
4.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426389	Sep 18, 2013	Mar 17, 2014
5.	50 Ω Terminator	Anritsu	BNC	001	Mar 20, 2013	Mar 19, 2014
6.	Software	Audix	E3	SET00200 9804M592	--	--

3.2 Block Diagram of Test Setup

3.2.1 EUT & Peripherals



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 In USB Play mode, set the EUT play digital media from U-Disk.

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
HDMI 1920*1080@60Hz
D-Sub 1024*768@60Hz
D-Sub 800*600@60Hz
D-Sub 640*480@60Hz
USB Play

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
HDMI 1920*1080@60Hz	P13
D-Sub 1024*768@60Hz	P14
D-Sub 800*600@60Hz	P15
D-Sub 640*480@60Hz	P16
USB Play	P17

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 D-Sub 1024*768@60Hz test mode. The worst emission is detected at 0.803 MHz (Quasi-Peak Value) with corrected signal level of 49.86 dB (μ V) (limit is 56.00 dB (μ V)), when the Neutral of the EUT is connected to AMN.

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 48%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Oct 16, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.194	53.20	0.12	53.32	63.86	10.54	QP
	0.611	46.70	0.04	46.74	56.00	9.26	
	0.798	49.40	0.08	49.48	56.00	6.52	
	1.393	40.20	0.06	40.26	56.00	15.74	
	5.388	31.10	0.22	31.32	60.00	28.68	
	22.860	36.01	-0.31	35.70	60.00	24.30	
	0.194	40.00	0.12	40.12	53.86	13.74	AV
	0.611	30.80	0.04	30.84	46.00	15.16	
	0.798	34.30	0.08	34.38	46.00	11.62	
	1.393	25.60	0.06	25.66	46.00	20.34	
	5.388	24.90	0.22	25.12	50.00	24.88	
	22.860	26.81	-0.31	26.50	50.00	23.50	
Neutral	0.195	53.79	0.20	53.99	63.84	9.85	QP
	0.611	45.70	0.15	45.85	56.00	10.15	
	0.806	49.50	0.14	49.64	56.00	6.36	
	1.300	37.90	0.17	38.07	56.00	17.93	
	5.954	32.80	0.28	33.08	60.00	26.92	
	20.630	39.99	0.82	40.81	60.00	19.19	
	0.195	41.09	0.20	41.29	53.84	12.55	AV
	0.611	30.10	0.15	30.25	46.00	15.75	
	0.806	33.90	0.14	34.04	46.00	11.96	
	1.300	24.20	0.17	24.37	46.00	21.63	
	5.954	25.90	0.28	26.18	50.00	23.82	
	20.630	32.89	0.82	33.71	50.00	16.29	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 48%RH

Test Mode : D-Sub 1024*768@60Hz Date of Test : Oct 16, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.193	53.39	0.13	53.52	63.90	10.38	QP
	0.613	46.60	0.04	46.64	56.00	9.36	
	0.798	49.72	0.08	49.80	56.00	6.20	
	1.326	39.91	0.05	39.96	56.00	16.04	
	11.590	29.40	0.12	29.52	60.00	30.48	
	26.560	33.80	-0.29	33.51	60.00	26.49	
	0.193	39.49	0.13	39.62	53.90	14.28	AV
	0.613	30.70	0.04	30.74	46.00	15.26	
	0.798	34.30	0.08	34.38	46.00	11.62	
	1.326	24.91	0.05	24.96	46.00	21.04	
	11.590	24.30	0.12	24.42	50.00	25.58	
	26.560	26.60	-0.29	26.31	50.00	23.69	
Neutral	0.192	54.20	0.19	54.39	63.96	9.57	QP
	0.619	45.70	0.15	45.85	56.00	10.15	
	0.803	49.72	0.14	49.86	56.00	6.14	
	1.245	39.00	0.17	39.17	56.00	16.83	
	6.083	33.90	0.28	34.18	60.00	25.82	
	20.760	41.30	0.82	42.12	60.00	17.88	
	0.192	39.40	0.19	39.59	53.96	14.37	AV
	0.619	31.20	0.15	31.35	46.00	14.65	
	0.803	33.90	0.14	34.04	46.00	11.96	
	1.245	24.80	0.17	24.97	46.00	21.03	
	6.083	26.70	0.28	26.98	50.00	23.02	
	20.760	35.10	0.82	35.92	50.00	14.08	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 48%RH

Test Mode : D-Sub 800*600@60Hz Date of Test : Oct 16, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.193	53.19	0.13	53.32	63.92	10.60	QP
	0.614	46.60	0.05	46.65	56.00	9.35	
	0.796	49.48	0.08	49.56	56.00	6.44	
	1.310	40.11	0.05	40.16	56.00	15.84	
	5.133	31.50	0.21	31.71	60.00	28.29	
	21.560	36.60	-0.19	36.41	60.00	23.59	
	AV	0.193	39.29	0.13	39.42	53.92	14.50
		0.614	30.80	0.05	30.85	46.00	15.15
		0.796	34.40	0.08	34.48	46.00	11.52
		1.310	25.11	0.05	25.16	46.00	20.84
		5.133	24.40	0.21	24.61	50.00	25.39
		21.560	28.10	-0.19	27.91	50.00	22.09
Neutral	0.194	53.79	0.20	53.99	63.85	9.86	QP
	0.618	45.60	0.15	45.75	56.00	10.25	
	0.804	49.40	0.14	49.54	56.00	6.46	
	1.238	38.50	0.17	38.67	56.00	17.33	
	6.021	31.40	0.28	31.68	60.00	28.32	
	20.520	40.00	0.81	40.81	60.00	19.19	
	AV	0.194	41.19	0.20	41.39	53.85	12.46
		0.618	30.90	0.15	31.05	46.00	14.95
		0.804	33.80	0.14	33.94	46.00	12.06
		1.238	24.60	0.17	24.77	46.00	21.23
		6.021	25.40	0.28	25.68	50.00	24.32
		20.520	32.40	0.81	33.21	50.00	16.79

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 48%RH

Test Mode : D-Sub 640*480@60Hz Date of Test : Oct 16, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.194	53.10	0.12	53.22	63.86	10.64	QP
	0.598	47.00	0.03	47.03	56.00	8.97	
	0.778	49.30	0.09	49.39	56.00	6.61	
	1.325	40.41	0.05	40.46	56.00	15.54	
	5.471	31.80	0.22	32.02	60.00	27.98	
	20.560	38.40	-0.10	38.30	60.00	21.70	
	0.194	40.00	0.12	40.12	53.86	13.74	AV
	0.598	31.30	0.03	31.33	46.00	14.67	
	0.778	34.40	0.09	34.49	46.00	11.51	
	1.325	25.31	0.05	25.36	46.00	20.64	
	5.471	25.70	0.22	25.92	50.00	24.08	
	20.560	30.90	-0.10	30.80	50.00	19.20	
Neutral	0.191	53.70	0.19	53.89	64.01	10.12	QP
	0.607	45.90	0.16	46.06	56.00	9.94	
	0.803	49.30	0.14	49.44	56.00	6.56	
	1.257	39.10	0.17	39.27	56.00	16.73	
	5.662	32.70	0.26	32.96	60.00	27.04	
	20.700	39.79	0.82	40.61	60.00	19.39	
	0.191	38.60	0.19	38.79	54.01	15.22	AV
	0.607	30.20	0.16	30.36	46.00	15.64	
	0.803	33.90	0.14	34.04	46.00	11.96	
	1.257	24.40	0.17	24.57	46.00	21.43	
	5.662	25.40	0.26	25.66	50.00	24.34	
	20.700	32.99	0.82	33.81	50.00	16.19	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 48%RH

Test Mode : USB Play Date of Test : Oct 16, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.195	53.00	0.12	53.12	63.82	10.70	QP
	0.605	46.80	0.04	46.84	56.00	9.16	
	0.782	49.40	0.09	49.49	56.00	6.51	
	1.306	40.21	0.05	40.26	56.00	15.74	
	5.451	32.90	0.22	33.12	60.00	26.88	
	21.040	38.20	-0.14	38.06	60.00	21.94	
	AV	0.195	40.40	0.12	40.52	53.82	13.30
		0.605	31.10	0.04	31.14	46.00	14.86
		0.782	34.30	0.09	34.39	46.00	11.61
		1.306	25.11	0.05	25.16	46.00	20.84
		5.451	26.00	0.22	26.22	50.00	23.78
		21.040	32.10	-0.14	31.96	50.00	18.04
Neutral	0.194	53.79	0.20	53.99	63.86	9.87	QP
	0.614	45.80	0.15	45.95	56.00	10.05	
	0.815	49.20	0.14	49.34	56.00	6.66	
	1.260	38.80	0.17	38.97	56.00	17.03	
	6.018	33.10	0.28	33.38	60.00	26.62	
	20.850	39.10	0.82	39.92	60.00	20.08	
	AV	0.194	41.39	0.20	41.59	53.86	12.27
		0.614	30.20	0.15	30.35	46.00	15.65
		0.815	33.30	0.14	33.44	46.00	12.56
		1.260	24.00	0.17	24.17	46.00	21.83
		6.018	25.40	0.28	25.68	50.00	24.32
		20.850	32.10	0.82	32.92	50.00	17.08

TEST ENGINEER: ERIC TANG

4 RADIATED EMISSION TEST

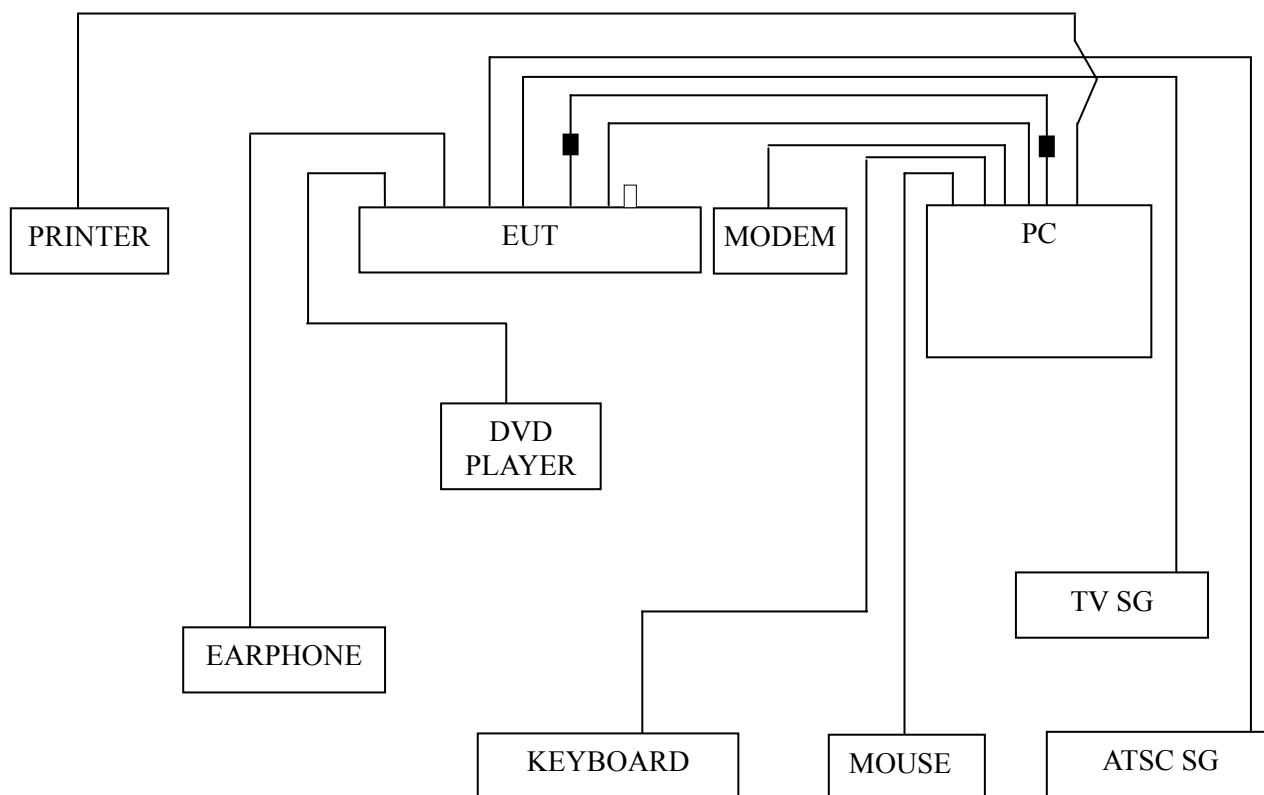
4.1 Test Equipment

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	ESCI	101302	Sep 03, 2013	Sep 02, 2014
2.	Preamplifier	Agilent	8447D	2944A10548	Sep 18, 2013	Mar 17, 2014
3.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2013	Mar 19, 2014
4.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 03, 2013	May 02, 2014
5.	Horn Antenna	EMCO	3115	9607-4878	May 11, 2013	May 10, 2014
6.	Spectrum	Agilent	E7405A	MY45106600	Dec 17, 2012	Dec 16, 2013
7.	50 Coaxial Switch	Anritsu	MP59B	6200426390	Sep 18, 2013	Mar 17, 2014
8.	Software	Audix	E3	SET00200 9912M295-2	--	--

4.2 Block Diagram of Test Setup

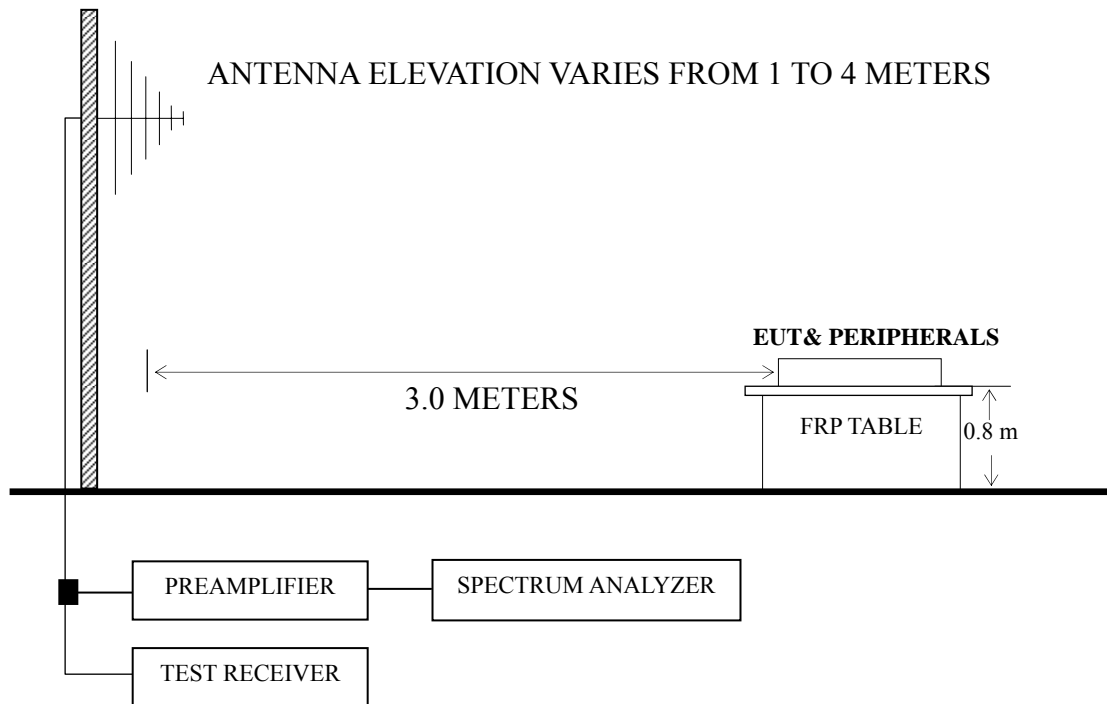
4.2.1 EUT & Peripherals



■ : Ferrite core

□ : U-Disk

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.

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 I.F. bandwidth of Test Receiver R&S ESCI 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 the worst test mode in 30 – 1000 MHz test.

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
HDMI 1920*1080@60Hz	P22 – P23
D-Sub 1024*768@60Hz	P24
HDMI 1280*1024@60Hz	P25
HDMI 640*480@60Hz	P26
USB Play	P27

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

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

NOTE 2 – All readings are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.

NOTE 3 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 4 – The worst case is for HDMI 1920*1080@60Hz test mode. The worst emission at horizontal polarization was detected at 662.440 MHz with corrected signal level of 35.64 dB ($\mu\text{V}/\text{m}$) (limit is 46.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.00 m height and the turntable was at 193°. The worst emission at vertical polarization was detected at 378.230 MHz with corrected signal level of 41.49 dB ($\mu\text{V}/\text{m}$) (limit is 46.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.00 m height and the turntable was at 165°.

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Oct 18, 2013

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
Horizontal	146.400	13.72	10.25	1.62	--	25.59	43.50	17.91	QP
	287.050	18.96	12.55	2.46	--	33.97	46.00	12.03	
	361.740	17.68	14.97	2.64	--	35.29	46.00	10.71	
	460.680	12.92	17.30	2.86	--	33.08	46.00	12.92	
	662.440	13.08	19.15	3.41	--	35.64	46.00	10.36	
	872.930	9.07	20.03	4.20	--	33.30	46.00	12.70	
	1055.000	48.09	23.91	4.94	38.08	38.86	74.00	35.14	PK
	1170.000	47.39	24.38	5.08	37.81	39.04	74.00	34.96	
	1272.000	45.90	24.87	5.30	37.55	38.52	74.00	35.48	
	1453.000	46.37	25.48	5.62	37.03	40.44	74.00	33.56	
	1636.000	47.55	27.09	5.81	36.61	43.84	74.00	30.16	
	1789.000	46.75	28.99	6.15	36.36	45.53	74.00	28.47	
	1055.000	35.85	23.91	4.94	38.08	26.62	54.00	27.38	AV
	1170.000	33.15	24.38	5.08	37.81	24.80	54.00	29.20	
	1272.000	32.63	24.87	5.30	37.55	25.25	54.00	28.75	
	1453.000	33.59	25.48	5.62	37.03	27.66	54.00	26.34	
	1636.000	34.28	27.09	5.81	36.61	30.57	54.00	23.43	
	1789.000	33.74	28.99	6.15	36.36	32.52	54.00	21.48	

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Oct 18, 2013

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	37.760	13.10	14.13	0.75	--	27.98	40.00	12.02	QP
	141.550	23.73	10.30	1.60	--	35.63	43.50	7.87	
	284.140	23.00	12.27	2.43	--	37.70	46.00	8.30	
	378.230	23.76	15.07	2.66	--	41.49	46.00	4.51	
	658.560	12.95	18.85	3.41	--	35.21	46.00	10.79	
	943.740	15.85	19.40	4.68	--	39.93	46.00	6.07	
	1028.000	47.11	23.81	4.92	38.14	37.70	74.00	36.30	PK
	1077.000	47.00	24.00	4.98	38.03	37.95	74.00	36.05	
	1188.000	46.29	24.48	5.10	37.77	38.10	74.00	35.90	
	1445.000	45.68	25.46	5.61	37.05	39.70	74.00	34.30	
	1653.000	47.16	27.31	5.81	36.58	43.70	74.00	30.30	
	1866.000	44.35	29.84	6.17	36.26	44.10	74.00	29.90	
	1028.000	34.29	23.81	4.92	38.14	24.88	54.00	29.12	AV
	1077.000	33.49	24.00	4.98	38.03	24.44	54.00	29.56	
	1188.000	33.20	24.48	5.10	37.77	25.01	54.00	28.99	
	1445.000	32.85	25.46	5.61	37.05	26.87	54.00	27.13	
	1653.000	34.03	27.31	5.81	36.58	30.57	54.00	23.43	
	1866.000	31.04	29.84	6.17	36.26	30.79	54.00	23.21	

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 60%RH

Test Mode : D-Sub 1024*768@60Hz Date of Test : Oct 18, 2013

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	105.660	13.91	11.40	1.38	26.69	43.50	16.81
	150.280	17.38	10.04	1.64	29.06	43.50	14.44
	234.670	16.18	10.00	2.13	28.31	46.00	17.69
	378.230	13.61	15.07	2.66	31.34	46.00	14.66
	585.810	11.87	18.72	3.18	33.77	46.00	12.23
	887.480	9.69	19.80	4.43	33.92	46.00	12.08
Vertical	38.730	16.58	13.30	0.76	30.64	40.00	9.36
	115.360	13.26	11.58	1.45	26.29	43.50	17.21
	146.400	14.50	10.25	1.62	26.37	43.50	17.13
	370.470	11.03	14.85	2.65	28.53	46.00	17.47
	533.430	7.46	18.67	3.05	29.18	46.00	16.82
	908.820	8.15	19.30	4.55	32.00	46.00	14.00

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 60%RH

Test Mode : HDMI 1280*1024@60Hz Date of Test : Oct 18, 2013

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	72.680	16.75	6.20	0.97	23.92	40.00	16.08
	142.520	15.94	10.30	1.60	27.84	43.50	15.66
	291.900	21.41	12.75	2.49	36.65	46.00	9.35
	370.470	19.96	14.85	2.65	37.46	46.00	8.54
	653.710	18.11	18.70	3.38	40.19	46.00	5.81
	875.840	16.43	20.03	4.32	40.78	46.00	5.22
Vertical	38.730	13.65	13.30	0.76	27.71	40.00	12.29
	144.460	23.57	10.30	1.61	35.48	43.50	8.02
	287.050	20.37	12.55	2.46	35.38	46.00	10.62
	374.350	23.12	14.95	2.66	40.73	46.00	5.27
	655.650	13.68	18.70	3.41	35.79	46.00	10.21
	928.220	16.68	19.30	4.63	40.61	46.00	5.39

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 60%RH

Test Mode : HDMI 640*480@60Hz Date of Test : Oct 18, 2013

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	33.880	12.42	16.12	0.70	29.24	40.00	10.76
	72.680	19.95	6.20	0.97	27.12	40.00	12.88
	133.790	17.56	11.22	1.56	30.34	43.50	13.16
	243.400	20.46	11.10	2.17	33.73	46.00	12.27
	491.720	14.30	17.68	2.96	34.94	46.00	11.06
	638.190	11.47	18.48	3.35	33.30	46.00	12.70
Vertical	38.730	16.74	13.30	0.76	30.80	40.00	9.20
	78.500	16.04	6.71	1.05	23.80	40.00	16.20
	120.210	16.75	11.41	1.48	29.64	43.50	13.86
	180.350	20.75	8.20	1.84	30.79	43.50	12.71
	320.030	14.30	13.90	2.58	30.78	46.00	15.22
	495.600	10.29	17.85	2.96	31.10	46.00	14.90

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD23A300US Humidity : 60%RH

Test Mode : USB Play Date of Test : Oct 18, 2013

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	102.750	17.41	10.93	1.36	29.70	43.50	13.80
	141.550	15.76	10.30	1.60	27.66	43.50	15.84
	206.540	18.14	7.75	1.98	27.87	43.50	15.63
	369.500	18.08	14.80	2.65	35.53	46.00	10.47
	514.030	7.95	18.38	3.01	29.34	46.00	16.66
	738.100	10.35	18.90	3.57	32.82	46.00	13.18
Vertical	33.880	8.11	16.12	0.70	24.93	40.00	15.07
	77.530	16.79	6.65	1.05	24.49	40.00	15.51
	136.700	19.26	10.74	1.58	31.58	43.50	11.92
	287.050	19.43	12.55	2.46	34.44	46.00	11.56
	382.110	21.45	15.23	2.66	39.34	46.00	6.66
	658.560	12.95	18.85	3.41	35.21	46.00	10.79

TEST ENGINEER: NEAL WANG

5 DEBUG DESCRIPTION

The following components are used during the countermeasure procedures:

Name	M/N	Manufacturer	Location
Aluminum tape	DBA40X100	Qingdao Joinset S&T Co., Ltd.	See Internal Photo Figure 15, 16, 17

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: Neal Wang
(NEAL WANG)

6 DEVIATION TO TEST SPECIFICATIONS

None.