

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

LED LCD TV

Model No.	Brand
32K20DW, 32K21DW, 32K22DW, 32K23DW, 32K24DW, 32K25DW, LHD32K20DWUS, 32H3, 32H3C	Hisense

FCC ID : W9HLCDC0024

Prepared For : Hisense Electric Co., Ltd.  
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Development Zone, Qingdao, China

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Report No. : ACI-F13113A2  
Date of Test : Mar 24 – 26, 2014  
Date of Report : Apr 15, 2014

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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
Refer to Sec2.1	Hisense	120V/60Hz

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 2013  
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 Mar 24 – 26, 2014 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.F13114A2, a Verification report.***

Date of Test : Mar 24 – 26, 2014 Date of Report : Apr 15, 2014

Producer :   
 EMILY ZHU / Assistant

Review :   
 DIO YANG / Deputy 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
<b>EMISSION</b>			
Conducted Disturbance at the Mains Terminal	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2013 AND ANSI C63.4-2003	15.107(a) Class B	Pass
Radiated Disturbance	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2013 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 :  Production  Pre-product  Pro-type

Model No. : LHD32K20DWUS, 32K20DW, 32K21DW, 32K22DW, 32K23DW, 32K24DW, 32K25DW, 32H3, 32H3C

Note #1 : The modified histories of report are as follows:

Report No.	Model No.	Rev. Summary	Edition No.	Data of Rev.
ACI-F13113	LHD32K20DWUS, 32K20DW	Original Report	0	Aug 21, 2013
ACI-F13113A1	LHD32K20DWUS, 32K20DW, 32K21DW, 32K22DW, 32K23DW, 32K24DW, 32K25DW, 32H5, 32H5C, 32H5E, 32H5I, 32H5S	1. To add ten new model names.	Rev. A1	Dec 30, 2013
ACI-F13113A2	LHD32K20DWUS, 32K20DW, 32K21DW, 32K22DW, 32K23DW, 32K24DW, 32K25DW, 32H3, 32H3C	1. To add two new model names (32H3C and 32H3) and remove the model 32H5, 32H5C, 32H5E, 32H5I, 32H5S. 2. To modify panel and power board.	Rev. A2	Apr 15, 2014

Brand Name : Hisense

Note #2 : The above models are all the same except for the model name.  
LHD32K20DWUS 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 : Hisense M/N : HD315DH-E31\S2
Max Resolution	:	1920*1080@60Hz
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:

## Side Port:

- (1) One HDMI1/DVI Port  
: Connected with PC
- (2) One HDMI2/ARC Port  
: Connected with DVD PLAYER
- (3) One DVI Audio In Port  
: Connected with PC
- (4) One component of Audio/YPbPr Audio Port  
: Connected with DVD PLAYER
- (5) One component of Video/YPbPr Port  
: Connected with DVD PLAYER
- (6) One ANT/CABLE IN Port  
: Connected with Antenna or ATSC SG / TV  
SG
- (7) One DIGITAL AUDIO OUT Port  
: Connected with DVD PLAYER
- (8) One USB Port  
: Connected with U-Disk
- (9) One LAN Port  
: Connected with PC
- (10) One Audio Out/Earphone 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;  
BSMI; 3C; MIC

### 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 : 1406  
Serial Number : 0200702302609  
Data Cable : Shielded, undetachable ,1.8m  
Certificate : CE/EMC, FCC DoC, VCCI, MIC, C-Tick,  
BSMI

### 2.2.4 Mouse

Manufacturer : Microsoft  
Model Number : 1405  
Serial Number : 0204603562213  
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 : audio-technica  
Model Number : ATH-CKL200

### 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

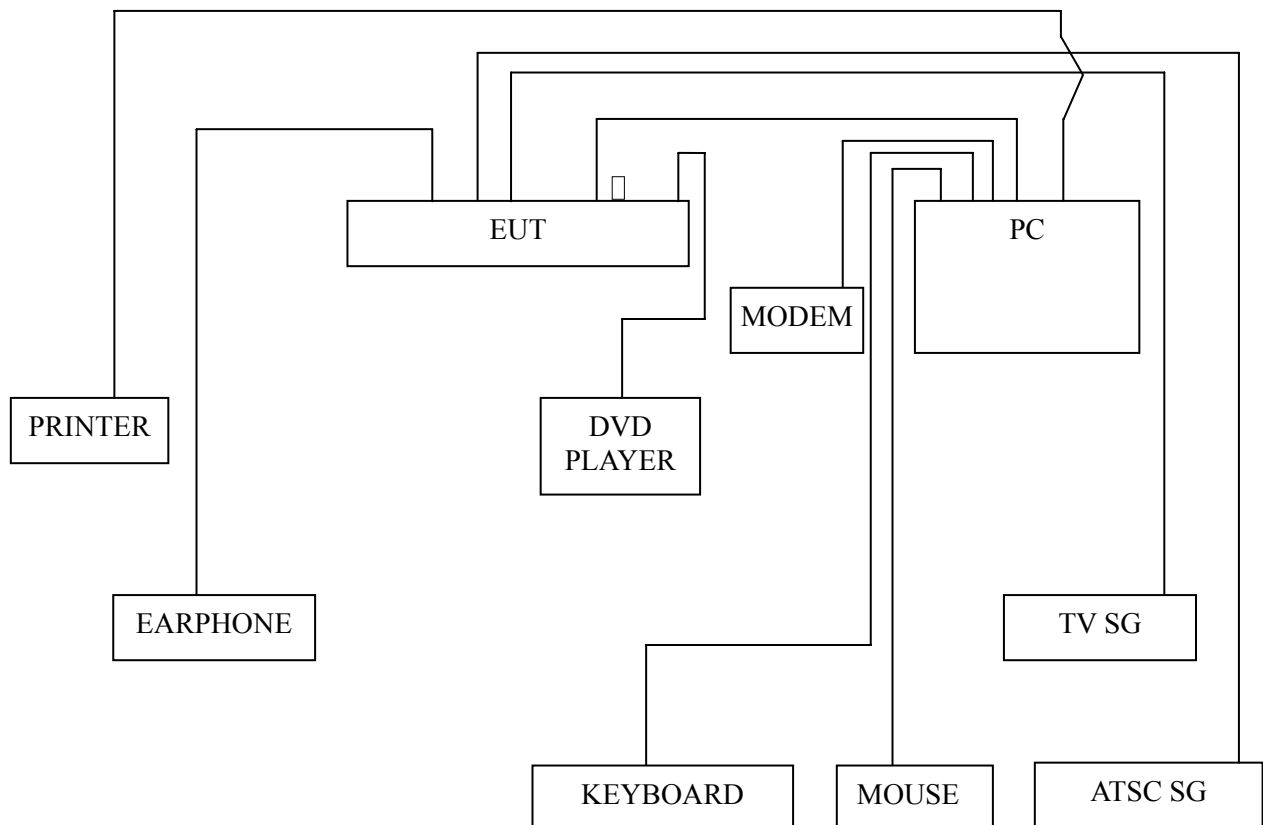
#### 3.1 Test Equipment

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, 2014	Mar 19, 2015
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 25, 2014	Feb 24, 2015
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 20, 2014	Mar 19, 2015
4.	50 $\Omega$ Coaxial Switch	Anritsu	MP59B	6200426389	Mar 17, 2014	Sep 16, 2014
5.	50 $\Omega$ Terminator	Anritsu	BNC	001	Mar 20, 2014	Mar 19, 2015
6.	Software	Audix	E3	6.2009-1-15	--	--

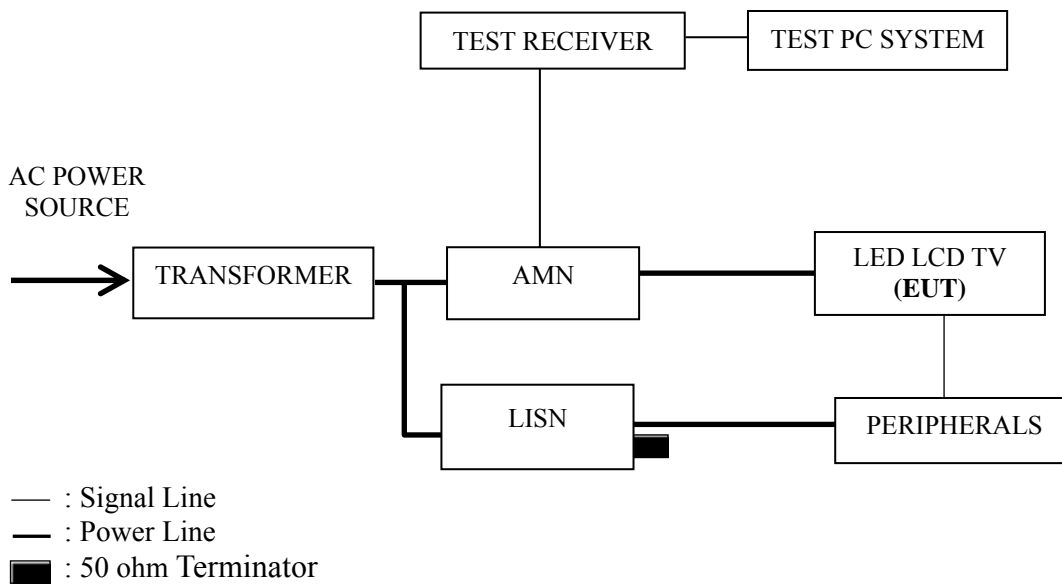
#### 3.2 Block Diagram of Test Setup

##### 3.2.1 EUT & Peripherals



□ : U-Disk

### 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 ( $\mu$ 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 HDMI Input).

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

3.5.6 In LAN Play mode, set the EUT play digital media through LAN port.

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

3.5.8 The test modes are as follows:

Test Mode
HDMI 1920*1080@60Hz
HDMI 1280*1024@60Hz
HDMI 640*480@60Hz
USB Play
LAN 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
HDMI 1280*1024@60Hz	P14
HDMI 640*480@60Hz	P15
USB Play	P16
LAN 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 3 – The worst case is for HDMI 1920\*1080@60Hz test mode. The worst emission is detected at 23.730 MHz (Average Value) with corrected signal level of 44.47 dB ( $\mu$ V) (limit is 50.00 dB ( $\mu$ V)), when the Neutral of the EUT is connected to AMN.

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 48%RH

Test Mode : HDMI 1920\*1080@60Hz Date of Test : Mar 26, 2014

Test Line	Frequency (MHz)	Meter Reading dB( $\mu$ V)	Factor (dB)	Emission Level dB( $\mu$ V)	Limits dB( $\mu$ V)	Margin (dB)	Remark
Line	0.150	50.50	0.16	50.66	65.99	15.33	QP
	0.200	49.20	0.12	49.32	63.62	14.30	
	0.341	35.30	0.03	35.33	59.19	23.86	
	0.693	33.21	0.09	33.30	56.00	22.70	
	7.295	35.80	0.26	36.06	60.00	23.94	
	23.800	50.60	-0.38	50.22	60.00	9.78	
	0.150	35.00	0.16	35.16	55.99	20.83	AV
	0.200	35.70	0.12	35.82	53.62	17.80	
	0.341	22.50	0.03	22.53	49.19	26.66	
	0.693	31.21	0.09	31.30	46.00	14.70	
	7.295	30.70	0.26	30.96	50.00	19.04	
	23.800	42.50	-0.38	42.12	50.00	7.88	
Neutral	0.150	48.60	0.15	48.75	65.99	17.24	QP
	0.202	48.30	0.20	48.50	63.52	15.02	
	0.694	32.51	0.11	32.62	56.00	23.38	
	2.769	27.90	0.17	28.07	56.00	27.93	
	7.193	38.10	0.34	38.44	60.00	21.56	
	23.730	51.41	0.87	52.28	60.00	7.72	
	0.150	32.50	0.15	32.65	55.99	23.34	AV
	0.202	36.40	0.20	36.60	53.52	16.92	
	0.694	31.21	0.11	31.32	46.00	14.68	
	2.769	25.20	0.17	25.37	46.00	20.63	
	7.193	33.50	0.34	33.84	50.00	16.16	
	<b>23.730</b>	<b>43.60</b>	<b>0.87</b>	<b>44.47</b>	<b>50.00</b>	<b>5.53</b>	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 48%RH

Test Mode : HDMI 1280\*1024@60Hz Date of Test : Mar 26, 2014

Test Line	Frequency (MHz)	Meter Reading dB( $\mu$ V)	Factor (dB)	Emission Level dB( $\mu$ V)	Limits dB( $\mu$ V)	Margin (dB)	Remark
Line	0.151	46.50	0.16	46.66	65.97	19.31	QP
	0.200	47.60	0.12	47.72	63.61	15.89	
	0.336	34.29	0.04	34.33	59.30	24.97	
	0.694	33.20	0.10	33.30	56.00	22.70	
	7.574	33.00	0.26	33.26	60.00	26.74	
	23.380	51.00	-0.35	50.65	60.00	9.35	
	0.151	30.30	0.16	30.46	55.97	25.51	AV
	0.200	35.50	0.12	35.62	53.61	17.99	
	0.336	22.49	0.04	22.53	49.30	26.77	
	0.694	30.80	0.10	30.90	46.00	15.10	
	7.574	27.50	0.26	27.76	50.00	22.24	
	23.380	43.10	-0.35	42.75	50.00	7.25	
Neutral	0.151	48.80	0.15	48.95	65.94	16.99	QP
	0.202	47.60	0.20	47.80	63.52	15.72	
	0.693	32.30	0.12	32.42	56.00	23.58	
	2.765	28.30	0.17	28.47	56.00	27.53	
	7.245	37.00	0.34	37.34	60.00	22.66	
	23.410	50.61	0.86	51.47	60.00	8.53	
	0.151	33.00	0.15	33.15	55.94	22.79	AV
	0.202	36.10	0.20	36.30	53.52	17.22	
	0.693	30.90	0.12	31.02	46.00	14.98	
	2.765	25.40	0.17	25.57	46.00	20.43	
	7.245	32.80	0.34	33.14	50.00	16.86	
	<b>23.410</b>	<b>42.61</b>	<b>0.86</b>	<b>43.47</b>	<b>50.00</b>	<b>6.53</b>	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 48%RH

Test Mode : HDMI 640\*480@60Hz Date of Test : Mar 26, 2014

Test Line	Frequency (MHz)	Meter Reading dB( $\mu$ V)	Factor (dB)	Emission Level dB( $\mu$ V)	Limits dB( $\mu$ V)	Margin (dB)	Remark
Line	0.150	48.20	0.16	48.36	65.98	17.62	QP
	0.202	47.30	0.12	47.42	63.53	16.11	
	0.694	33.00	0.10	33.10	56.00	22.90	
	2.692	22.60	0.10	22.70	56.00	33.30	
	6.999	36.30	0.26	36.56	60.00	23.44	
	23.520	51.41	-0.37	51.04	60.00	8.96	
	0.150	32.90	0.16	33.06	55.98	22.92	AV
	0.202	36.30	0.12	36.42	53.53	17.11	
	0.694	31.00	0.10	31.10	46.00	14.90	
	2.692	17.40	0.10	17.50	46.00	28.50	
	6.999	31.10	0.26	31.36	50.00	18.64	
	23.520	43.61	-0.37	43.24	50.00	6.76	
Neutral	0.150	47.00	0.15	47.15	65.99	18.84	QP
	0.204	46.90	0.20	47.10	63.44	16.34	
	0.694	32.01	0.11	32.12	56.00	23.88	
	4.087	35.90	0.21	36.11	56.00	19.89	
	7.213	38.60	0.34	38.94	60.00	21.06	
	23.600	51.00	0.87	51.87	60.00	8.13	
	0.150	31.30	0.15	31.45	55.99	24.54	AV
	0.204	35.00	0.20	35.20	53.44	18.24	
	0.694	30.61	0.11	30.72	46.00	15.28	
	4.087	22.80	0.21	23.01	46.00	22.99	
	7.213	33.30	0.34	33.64	50.00	16.36	
	<b>23.600</b>	<b>42.70</b>	<b>0.87</b>	<b>43.57</b>	<b>50.00</b>	<b>6.43</b>	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 48%RH

Test Mode : USB Play Date of Test : Mar 26, 2014

Test Line	Frequency (MHz)	Meter Reading dB( $\mu$ V)	Factor (dB)	Emission Level dB( $\mu$ V)	Limits dB( $\mu$ V)	Margin (dB)	Remark
Line	0.150	46.80	0.16	46.96	65.98	19.02	QP
	0.204	46.79	0.12	46.91	63.44	16.53	
	0.350	34.51	0.02	34.53	58.96	24.43	
	0.694	32.80	0.10	32.90	56.00	23.10	
	7.724	33.20	0.26	33.46	60.00	26.54	
	23.380	50.80	-0.35	50.45	60.00	9.55	
	0.150	30.60	0.16	30.76	55.98	25.22	AV
	0.204	35.99	0.12	36.11	53.44	17.33	
	0.350	21.81	0.02	21.83	48.96	27.13	
	0.694	31.00	0.10	31.10	46.00	14.90	
	7.724	27.50	0.26	27.76	50.00	22.24	
	23.380	42.70	-0.35	42.35	50.00	7.65	
Neutral	0.150	48.00	0.15	48.15	65.99	17.84	QP
	0.203	46.80	0.20	47.00	63.47	16.47	
	0.252	35.79	0.22	36.01	61.68	25.67	
	0.695	32.01	0.11	32.12	56.00	23.88	
	7.202	34.60	0.34	34.94	60.00	25.06	
	23.370	51.51	0.86	52.37	60.00	7.63	
	0.150	32.80	0.15	32.95	55.99	23.04	AV
	0.203	35.10	0.20	35.30	53.47	18.17	
	0.252	14.59	0.22	14.81	51.68	36.87	
	0.695	30.91	0.11	31.02	46.00	14.98	
	7.202	29.60	0.34	29.94	50.00	20.06	
	<b>23.370</b>	<b>43.21</b>	<b>0.86</b>	<b>44.07</b>	<b>50.00</b>	<b>5.93</b>	

TEST ENGINEER: ERIC TANG



EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 48%RH

Test Mode : LAN Play Date of Test : Mar 26, 2014

Test Line	Frequency (MHz)	Meter Reading dB( $\mu$ V)	Factor (dB)	Emission Level dB( $\mu$ V)	Limits dB( $\mu$ V)	Margin (dB)	Remark
Line	0.150	47.70	0.16	47.86	65.99	18.13	QP
	0.206	46.90	0.11	47.01	63.36	16.35	
	0.340	34.20	0.03	34.23	59.21	24.98	
	0.695	32.90	0.10	33.00	56.00	23.00	
	7.685	32.79	0.27	33.06	60.00	26.94	
	23.387	50.60	-0.35	50.25	60.00	9.75	
	0.150	33.30	0.16	33.46	55.99	22.53	AV
	0.206	35.60	0.11	35.71	53.36	17.65	
	0.340	22.10	0.03	22.13	49.21	27.08	
	0.695	30.90	0.10	31.00	46.00	15.00	
	7.685	27.59	0.27	27.86	50.00	22.14	
	23.387	42.60	-0.35	42.25	50.00	7.75	
Neutral	0.150	47.60	0.15	47.75	65.99	18.24	QP
	0.204	46.60	0.20	46.80	63.46	16.66	
	0.694	32.11	0.11	32.22	56.00	23.78	
	4.080	28.00	0.21	28.21	56.00	27.79	
	7.226	36.00	0.34	36.34	60.00	23.66	
	23.150	51.10	0.86	51.96	60.00	8.04	
	0.150	32.90	0.15	33.05	55.99	22.94	AV
	0.204	35.20	0.20	35.40	53.46	18.06	
	0.694	31.01	0.11	31.12	46.00	14.88	
	4.080	25.40	0.21	25.61	46.00	20.39	
	7.226	31.50	0.34	31.84	50.00	18.16	
	<b>23.150</b>	<b>42.30</b>	<b>0.86</b>	<b>43.16</b>	<b>50.00</b>	<b>6.84</b>	

TEST ENGINEER: ERIC TANG

## 4 RADIATED EMISSION TEST

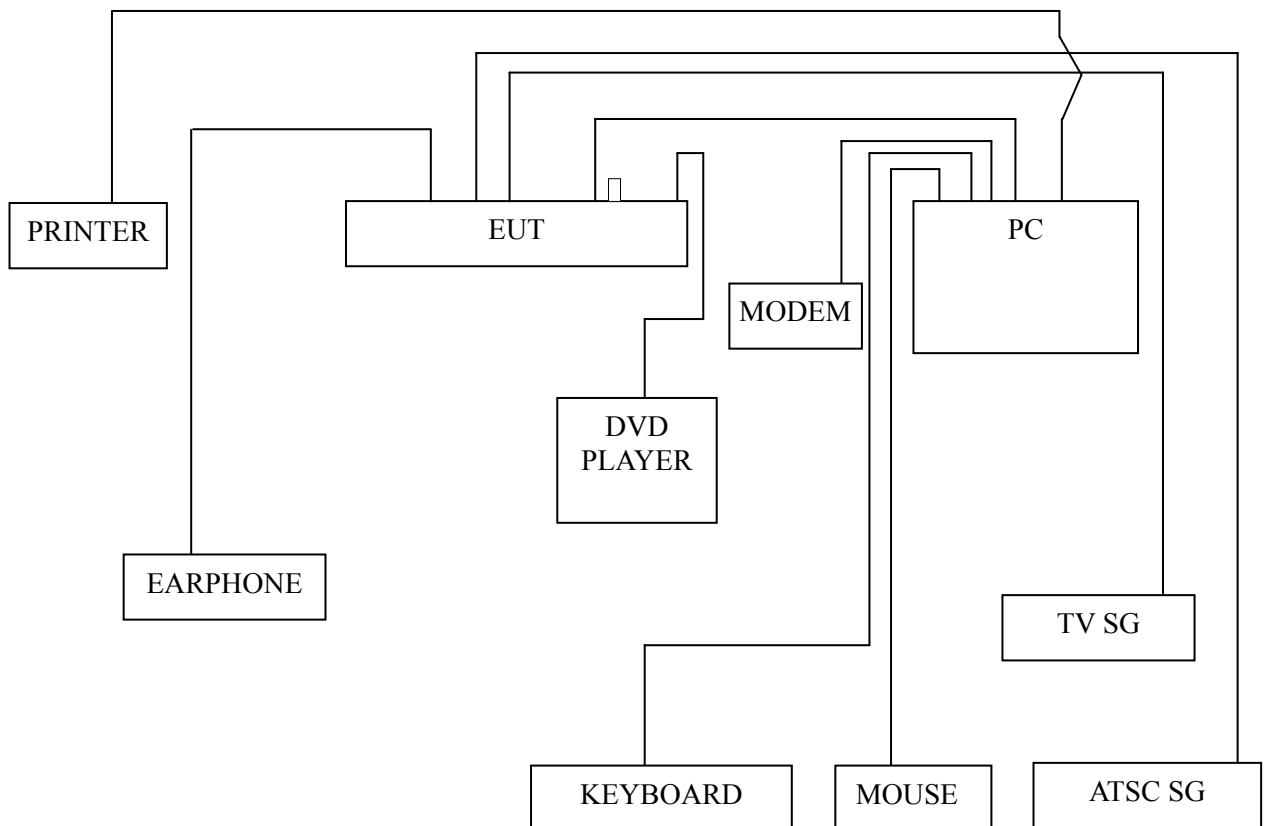
### 4.1 Test Equipment

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	Mar 17, 2014	Sep 16, 2014
3.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2014	Mar 19, 2015
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	Nov 11, 2013	Nov 10, 2014
7.	50 Coaxial Switch	Anritsu	MP59B	6200426390	Mar 17, 2014	Sep 16, 2014
8.	Software	Audix	E3	6.2007-9-10	--	--

### 4.2 Block Diagram of Test Setup

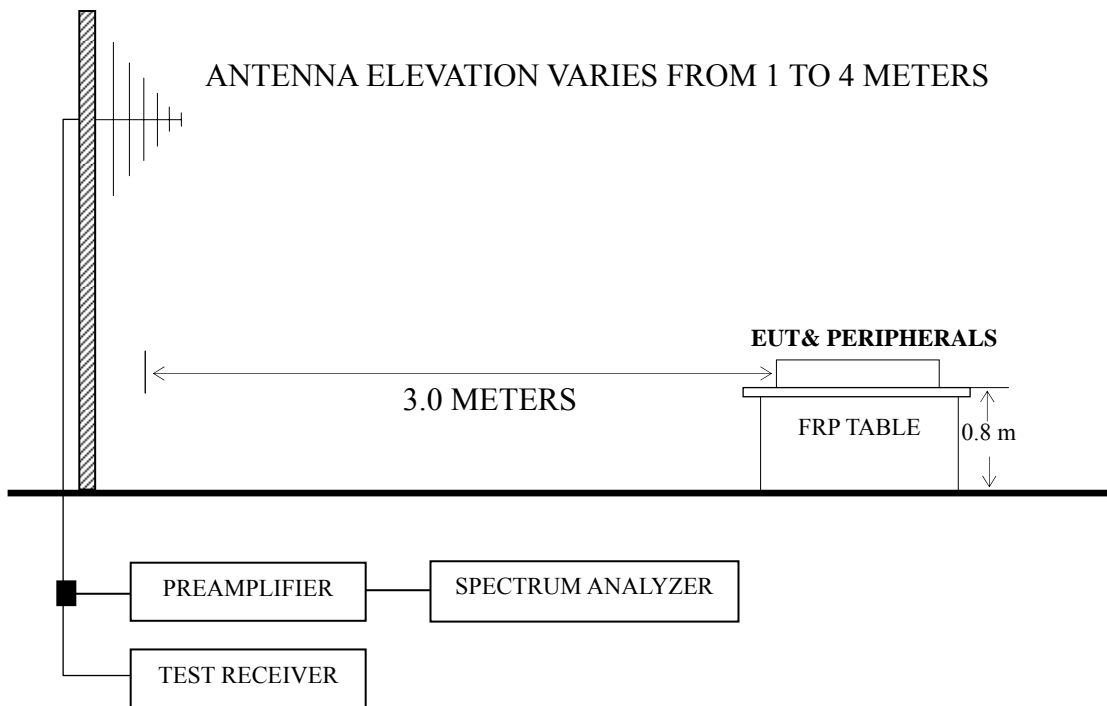
#### 4.2.1 EUT and Peripherals



□ : U-Disk

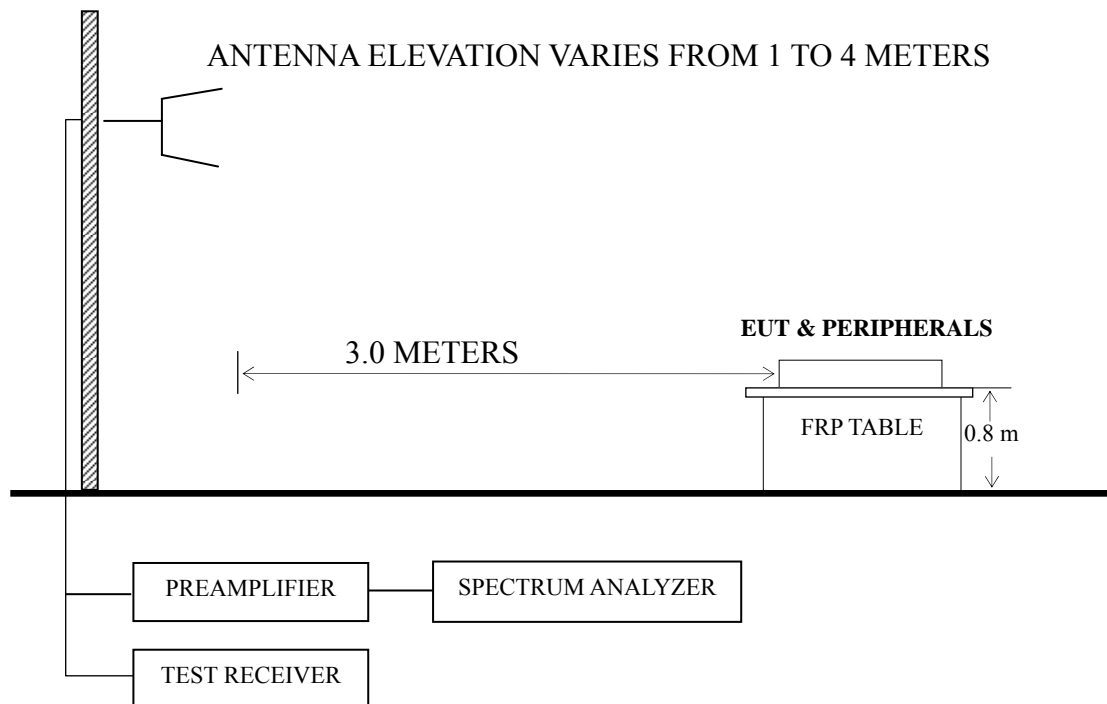
### 4.2.2 Radiated emission test setup

#### 4.2.2.1 Below 1GHz



■ : 50 ohm Coaxial Switch

#### 4.2.2.2 Above 1GHz



### 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) or horn 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 and The Spectrum Agilent E7405A was set at 1MHz above 1GHz..

The frequency range from 30 MHz to 1GHz 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
HDMI 1280*1024@60Hz	P24
HDMI 640*480@60Hz	P25
USB Play	P26
LAN Play	P27

- 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 values 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 HDMI 1920\*1080@60Hz test mode. The worst emission at horizontal polarization was detected at 705.360 MHz with corrected signal level of 43.44 dB ( $\mu\text{V}/\text{m}$ ) (limit is 46.00 dB ( $\mu\text{V}/\text{m}$ )), when the antenna was 1.20 m height and the turntable was at 25°. The worst emission at vertical polarization was detected at 555.740 MHz with corrected signal level of 43.19 dB ( $\mu\text{V}/\text{m}$ ) (limit is 46.00 dB ( $\mu\text{V}/\text{m}$ )), when the antenna was 1.10 m height and the turntable was at 210°.

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 60%RH

Test Mode : HMDI 1920\*1080@60Hz Date of Test : Mar 24, 2014

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	131.850	26.12	11.54	1.55	--	39.21	43.50	4.29	QP
	154.160	27.88	9.66	1.67	--	39.21	43.50	4.29	
	371.440	23.73	14.85	2.66	--	41.24	46.00	4.76	
	556.980	20.59	19.10	3.10	--	42.79	46.00	3.21	
	<b>705.360</b>	<b>19.92</b>	<b>19.97</b>	<b>3.55</b>	--	<b>43.44</b>	<b>46.00</b>	<b>2.56</b>	
	885.540	19.35	19.65	4.32	--	43.32	46.00	2.68	
	1065.000	47.83	23.95	4.96	38.06	38.68	74.00	35.32	PK
	1177.000	46.75	24.42	5.08	37.80	38.45	74.00	35.55	
	1215.000	47.52	24.60	5.15	37.70	39.57	74.00	34.43	
	1530.000	46.04	25.92	5.64	36.83	40.77	74.00	33.23	
	1753.000	46.94	28.56	6.06	36.42	45.14	74.00	28.86	
	1939.000	45.25	30.49	6.18	36.17	45.75	74.00	28.25	AV
	1065.000	34.66	23.95	4.96	38.06	25.51	54.00	28.49	
	1177.000	33.28	24.42	5.08	37.80	24.98	54.00	29.02	
	1215.000	34.39	24.60	5.15	37.70	26.44	54.00	27.56	
	1530.000	33.31	25.92	5.64	36.83	28.04	54.00	25.96	
1753.000	33.88	28.56	6.06	36.42	32.08	54.00	21.92		
1939.000	32.12	30.49	6.18	36.17	32.62	54.00	21.38		

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 60%RH

Test Mode : HDMI 1920\*1080@60Hz Date of Test : Mar 24, 2014

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	19.61	16.30	0.69	--	36.60	40.00	3.40	QP
	134.760	24.58	11.00	1.57	--	37.15	43.50	6.35	
	224.000	29.28	8.47	2.08	--	39.83	46.00	6.17	
	<b>555.740</b>	<b>20.89</b>	<b>19.20</b>	<b>3.10</b>	--	<b>43.19</b>	<b>46.00</b>	<b>2.81</b>	
	740.040	19.69	18.90	3.57	--	42.16	46.00	3.84	
	922.400	17.63	19.50	4.59	--	41.72	46.00	4.28	
	1011.000	46.70	23.74	4.91	38.18	37.17	74.00	36.83	PK
	1171.000	46.09	24.40	5.08	37.81	37.76	74.00	36.24	
	1234.000	46.28	24.70	5.20	37.65	38.53	74.00	35.47	
	1493.000	45.30	25.59	5.63	36.92	39.60	74.00	34.40	
	1535.000	45.69	25.96	5.64	36.82	40.47	74.00	33.53	
	1857.000	45.82	29.73	6.16	36.27	45.44	74.00	28.56	
	1011.000	33.83	23.74	4.91	38.18	24.30	54.00	29.70	AV
	1171.000	33.20	24.40	5.08	37.81	24.87	54.00	29.13	
	1234.000	34.00	24.70	5.20	37.65	26.25	54.00	27.75	
	1493.000	32.54	25.59	5.63	36.92	26.84	54.00	27.16	
	1535.000	32.11	25.96	5.64	36.82	26.89	54.00	27.11	
	1857.000	32.77	29.73	6.16	36.27	32.39	54.00	21.61	

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 60%RH

Test Mode : HDMI 1280\*1024@60Hz Date of Test : Mar 24, 2014

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)
Horizontal	154.160	27.04	9.66	1.67	38.37	43.50	5.13
	192.960	27.42	8.05	1.91	37.38	43.50	6.12
	293.840	22.60	12.67	2.49	37.76	46.00	8.24
	406.360	21.60	16.27	2.71	40.58	46.00	5.42
	<b>540.060</b>	<b>18.36</b>	<b>19.50</b>	<b>3.06</b>	<b>40.92</b>	<b>46.00</b>	<b>5.08</b>
	699.300	16.33	20.30	3.54	40.17	46.00	5.83
Vertical	31.940	17.22	16.50	0.68	34.40	40.00	5.60
	131.850	24.23	11.54	1.55	37.32	43.50	6.18
	224.000	25.96	8.47	2.08	36.51	46.00	9.49
	<b>539.250</b>	<b>18.59</b>	<b>19.50</b>	<b>3.06</b>	<b>41.15</b>	<b>46.00</b>	<b>4.85</b>
	699.300	15.93	20.30	3.54	39.77	46.00	6.23
	806.000	17.10	20.07	3.70	40.87	46.00	5.13

TEST ENGINEER: NEAL WANG



EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 60%RH

Test Mode : HDMI 640\*480@60Hz Date of Test : Mar 24, 2014

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)
Horizontal	131.850	23.29	11.54	1.55	36.38	43.50	7.12
	<b>154.160</b>	<b>27.60</b>	<b>9.66</b>	<b>1.67</b>	<b>38.93</b>	<b>43.50</b>	<b>4.57</b>
	306.450	20.52	13.00	2.56	36.08	46.00	9.92
	597.450	15.31	18.40	3.20	36.91	46.00	9.09
	697.360	16.92	20.30	3.54	40.76	46.00	5.24
	895.240	15.35	19.47	4.43	39.25	46.00	6.75
Vertical	<b>31.940</b>	<b>17.90</b>	<b>16.50</b>	<b>0.68</b>	<b>35.08</b>	<b>40.00</b>	<b>4.92</b>
	131.850	22.41	11.54	1.55	35.50	43.50	8.00
	289.960	25.33	12.90	2.46	40.69	46.00	5.31
	354.950	19.71	14.90	2.63	37.24	46.00	8.76
	697.360	13.37	20.30	3.54	37.21	46.00	8.79
	893.300	15.29	19.63	4.43	39.35	46.00	6.65

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 60%RH

Test Mode : USB Play Date of Test : Mar 24, 2014

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)
Horizontal	135.730	23.70	10.91	1.57	36.18	43.50	7.32
	159.980	24.06	9.60	1.70	35.36	43.50	8.14
	275.410	22.07	12.60	2.38	37.05	46.00	8.95
	526.640	15.18	18.35	3.05	36.58	46.00	9.42
	<b>693.480</b>	<b>15.55</b>	<b>20.30</b>	<b>3.54</b>	<b>39.39</b>	<b>46.00</b>	<b>6.61</b>
	925.310	14.90	19.50	4.59	38.99	46.00	7.01
Vertical	<b>30.970</b>	<b>14.88</b>	<b>17.65</b>	<b>0.67</b>	<b>33.20</b>	<b>40.00</b>	<b>6.80</b>
	137.670	23.90	10.58	1.58	36.06	43.50	7.44
	222.060	24.54	8.40	2.06	35.00	46.00	11.00
	355.920	20.37	14.93	2.63	37.93	46.00	8.07
	526.640	15.62	18.35	3.05	37.02	46.00	8.98
	975.750	12.61	20.90	4.78	38.29	54.00	15.71

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : LHD32K20DWUS Humidity : 60%RH

Test Mode : LAN Play Date of Test : Mar 24, 2014

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)
Horizontal	94.990	21.53	9.30	1.29	32.12	43.50	11.38
	135.730	24.24	10.91	1.57	36.72	43.50	6.78
	159.010	24.15	9.60	1.70	35.45	43.50	8.05
	294.810	21.26	12.60	2.52	36.38	46.00	9.62
	528.580	15.99	18.38	3.05	37.42	46.00	8.58
	<b>690.570</b>	<b>15.64</b>	<b>20.30</b>	<b>3.51</b>	<b>39.45</b>	<b>46.00</b>	<b>6.55</b>
Vertical	33.880	15.38	16.12	0.70	32.20	40.00	7.80
	74.620	23.04	6.46	1.00	30.50	40.00	9.50
	<b>131.850</b>	<b>24.23</b>	<b>11.54</b>	<b>1.55</b>	<b>37.32</b>	<b>43.50</b>	<b>6.18</b>
	228.850	24.50	9.50	2.09	36.09	46.00	9.91
	307.420	19.90	13.10	2.56	35.56	46.00	10.44
	693.480	12.43	20.30	3.54	36.27	46.00	9.73

TEST ENGINEER: NEAL WANG

## **5 DEVIATION TO TEST SPECIFICATIONS**

None.