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

## LED LCD TV

Model No.	Brand
LC-50N6000U, LC-50N6000C	Sharp

FCC ID: W9HLCDF0071

Prepared For: Hisense Electric Co., Ltd.

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Report No.: ACI-F16014 Date of Test: Jan 06 – 12, 2016 Date of Report: Jan 15, 2016

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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.

Tatung Mexico S.A. de C.V. Factory #3 HISENSE ELECTRONICA MEXICO, S.A. DE C.V.

**EUT Description** LED LCD TV

Model No.	Brand	Power Supply
LC-50N6000U, LC-50N6000C	Sharp	120V/60Hz

#### Test Procedure Used:

Data of Tost

Factory #2

## FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 2014 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 Jan 06 – 12, 2016 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.

Ion 06 12 2016

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.F16013, a Verification report.

Producer:  HUIMIN YAN / Assistant  Review:  SAMMY CHEN / Manager  For and on behalf of  Audix Technology (Shanghai) Co., Ltt.  Signatory:  Signatory:  Authorized Signature EMC BYRONKWO / Assistant General Manager	Date of Test:	Jaii 00 - 12, 2010	Date of Report.	Jan 15, 2010
Review:  SAMMY CHEN / Manager  For and on behalf of  Audix Technology (Shanghai) Co., Ltd.  Signatory:		11 NATE Y		
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SAMMY CHEN / Manager  For and on behalf of  Audix Technology (Shanghai) Co., Ltd.  Signatory:		HUIMIN YAN / Assistant		
SAMMY CHEN / Manager  For and on behalf of  Audix Technology (Shanghai) Co., Ltd.  Signatory:		$\cap$ $\cap$		
Audix Technology (Shanghai) Co., Ltd.	Review:	Sangle		
Signatory: Sun Ober for	For an	SAMMY CHEN / Manager		
Signatory:  Authorized Signature EMC BYRONKWO / Assistant General Manager	Audix Technology (Shan	ghai) Co., Ltd./		
Authorized Signature EMC BYRON KWO / Assistant General Manager	Signatory:	Sung Chen for		
	Authorized Signature EM	BYRONKWO / Assistant General Mana	ger	

Date of Report :

Ion 15 2016

# 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:

<b>Description of Test Item</b>	Standard	Limits	Results
	EMISSION		
Conducted Disturbance at the Mains Terminal	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2014 AND ANSI C63.4-2003	15.107(a) Class B	Pass
Radiated Disturbance	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2014 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 :  $\square$  Production  $\square$  Pre-product  $\square$  Pro-type

Model No : LC-50N6000U, LC-50N6000C

Note : The above models are all the same except for

model number.LC-50N6000U model is tested

and recorded in the report.

Brand : Sharp

Applicant : Hisense Electric Co., Ltd.

No.218 Qianwangang Road, Economy &

Technology Development Zone, Qingdao, China

Manufacturer : same as Applicant

Factory #1 : same as Applicant

Factory #2 : Tatung Mexico S.A. de C.V.

Miguel Catalán 420, Parque Industrial Rio Bravo,

Cd. Juarez, Chih., CP 32557

Factory #3 : HISENSE ELECTRONICA MEXICO, S.A.DE C.V.

Blvd. Sharp #3510 Parque Industrial Rosarito,

C.P. 22710 Playas de Rosarito, B.C.

LCD Panel : Manufacturer : Hisense

M/N : HD500DU-B52 (100)

Tuner : Manufacturer : XuGuang Tech. Co., Ltd.

M/N : HFT-96S3/W11FJ2H\ROH

Max Resolution : 3840\*2160@60Hz

HDMI Cable\*4 (Lab provide)

\*4 : Shielded, Detachable, 1.50m

Power Cord : Unshielded, Detachable, 1.80m, 2C

LAN Cable : Shielded, Detachable, 1.50m

USB Cable\*3 :

(Lab provide)

Shielded, Detachable, 1.00m, without core

MHL to HDMI Adaptor: Manufacture: CE-Link

with RCP (Lab provide) M/N: 3002

#### Remark:

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

Side Port:

(1) One USB3 Port

: Connected with Hard-Disk #1

(2) One HDMI2/ARC Port

: Connected with PC

(3) One HDMI1/MHL Port

: Connected with Smart Mobile Phone

(4) One Service Port

: This port does not open to user

(5) One Audio out Port

: Connected with Earphone

(6) One USB1 Port

: Connected with Hard-Disk #2

(7) One USB2 Port

: Connected with Hard-Disk #3

(8) One ANT/CABLE IN Port

: Connected with ATSC SG / TV SG

Back Port:

(9) One LAN Port

: Connected with PC

(10) One HDMI3 Port

: Connected with DVD PLAYER #1

(11) One HDMI4 Port

: Connected with DVD PLAYER #2

(12) One Digital Audio Out Port

: Connected with DVD PLAYER #1

(13) One COMPONENT IN/AV IN Port

: Connected with DVD PLAYER #1

# 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;

## 2.2.2 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

#### 2.2.3 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

#### 2.2.4 Modem

Manufacturer : TP-LINK
Model Number : TM-EC5658V
Serial Number : 07123301053

Data Cable : Shielded, Detachable, 1.8m

Certificate : CCC

#### 2.2.5 Earphone

Manufacturer : audio-technica Model Number : ATH-CKL200

## 2.2.6 TV Signal Generator

Manufacturer : FLUKE Model Number : 54200M01 Serial Number : 814008

## 2.2.7 ATSC Signal Generator

Manufacturer : SENCORE Model Number : ATSC997 Serial Number : 6790071

#### 2.2.8 DVD PLAYER #1

Manufacturer : PHILIPS
Model Number : DVP3986K/93
Serial Number : KX1A0902120108

Certificate : CCC

#### 2.2.9 DVD PLAYER #2

Manufacturer : PHILIPS
Model Number : DVP3986K/93
Serial Number : KX1A0902120082

Certificate : CCC

#### 2 2 10 Hard Disk #1

Manufacturer **Tetasys** Model Number F12

Serial Number A010022-4860010X

Data Cable Shielded, Undetachable, 1.8m.

CE, FCC DoC Certificate

#### 2.2.11 Hard Disk #2

Manufacturer **Tetasys** Model Number F12

Serial Number A010022-4A60007

Data Cable Shielded, Undetachable, 1.8m.

Certificate CE, FCC DoC

#### 2.2.12 Hard Disk #3

Manufacturer **Tetasys** Model Number F12

Serial Number A010022-40F0005

Shielded, Undetachable, 1.8m. Data Cable

Certificate CE, FCC DoC

#### 2.2.13 Smart Mobile Phone

Manufacturer **SAMSUNG** Model Number GT-I9100G Serial Number 6935152011519

Certificate CE/EMC

## 2.3 Description of Test Facility

Site Description Sept. 17, 1998 file on (No.3 3m Chamber) Jan.15, 2015 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 = 3.4dB

Radiated Emission Expanded Uncertainty (30-200MHz):

U = 4.6dB (Horizontal)

U = 4.3 dB (Vertical)

Radiated Emission Expanded Uncertainty (200M-1GHz):

U = 4.5 dB (Horizontal)

U = 5.4 dB (Vertical)

Radiated Emission Expanded Uncertainty (1GHz-6GHz):

U = 5.1 dB

# 3 CONDUCTED EMISSION TEST

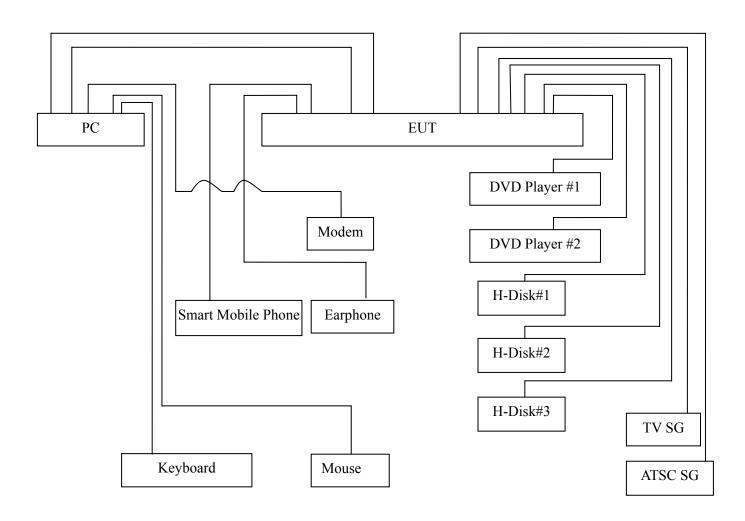
# 3.1 Test Equipment

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

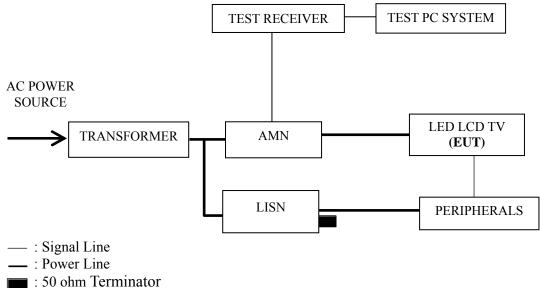
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Jul 03, 2015	Jul 02, 2016
2.	Artificial Mains Network (AMN)	R&S	ENV4200	100125	Jun 27, 2015	Jun 26, 2016
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-5	Mar 20, 2015	Mar 19, 2016
4.	50Ω Terminator	Anritsu	BNC	001	Mar 20, 2015	Mar 19, 2016
5.	Software	Audix	E3	6.111206		

# 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	Limits dB (μV)			
(MHz)	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 PC system sent the 1kHz audio signal to EUT through audio port, the EUT speak out 1kHz audio signal.
- 3.5.6 In USB Play mode, set the EUT play digital media from Hard Disk.
- 3.5.7 In LAN Play mode, set the EUT play digital media through LAN port.
- 3.5.8 In MHL mode, set the EUT play digital media from mobile phone.
- 3.5.9 The other peripherals devices were driven and operated during the test.
- 3.5.10 The test modes are as follows:

Test Mode
HDMI 3840*2160@60Hz & 1kHz playing
HDMI 1920*1080@60Hz & 1kHz playing
HDMI 1280*1024@60Hz & 1kHz playing
HDMI 640*480@60Hz & 1kHz playing
HDMI1080P
MHL
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 3840*2160@60Hz & 1kHz playing	P14
HDMI 1920*1080@60Hz & 1kHz playing	P15
HDMI 1280*1024@60Hz & 1kHz playing	P16
HDMI 640*480@60Hz & 1kHz playing	P17
HDMI1080P	P18
MHL	P19
USB Play	P20
LAN Play	P21

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 3840\*2160@60Hz & 1kHz playing test mode. The worst emission is detected at 0.197MHz (Average Value) with corrected signal level of 58.92 dB ( $\mu$ V) (limit is 63.73 dB ( $\mu$ V)), when the Line of the EUT is connected to AMN.

Model No. : LC-50N6000U Humidity : 48%RH

Test Mode : HDMI 3840\*2160@60Hz Date of Test : Jan 06, 2016

& 1kHz Playing

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(µV)	Limits dB(µV)	Margin (dB)	Remark
	0.197	48.40	10.52	58.92	63.73	4.81	
	0.460	36.60	10.40	47.00	56.69	9.69	
	0.600	31.00	10.38	41.38	56.00	14.62	ΟD
	1.192	28.50	10.39	38.89	56.00	17.11	QP
	2.032	26.60	10.41	37.01	56.00	18.99	
Time	5.230	34.61	10.47	45.08	60.00	14.92	
Line	0.197	32.30	10.52	42.82	53.73	10.91	
	0.460	23.30	10.40	33.70	46.69	12.99	
	0.600	18.20	10.38	28.58	46.00	17.42	AV
	1.192	15.30	10.39	25.69	46.00	20.31	
	2.032	15.80	10.41	26.21	46.00	19.79	
	5.230	24.71	10.47	35.18	50.00	14.82	
	0.197	47.60	10.50	58.10	63.72	5.62	
	0.453	32.50	10.38	42.88	56.82	13.94	
	0.587	28.80	10.36	39.16	56.00	16.84	OD
	1.186	27.91	10.37	38.28	56.00	17.72	QP
	1.862	25.50	10.41	35.91	56.00	20.09	
Neutral	5.234	37.51	10.47	47.98	60.00	12.02	
Neutrai	0.197	31.40	10.50	41.90	53.72	11.82	
	0.453	20.40	10.38	30.78	46.82	16.04	
	0.587	15.20	10.36	25.56	46.00	20.44	AV
	1.186	15.21	10.37	25.58	46.00	20.42	
	1.862	15.60	10.41	26.01	46.00	19.99	
	5.234	28.91	10.47	39.38	50.00	10.62	

Model No. : LC-50N6000U Humidity : 48%RH

Test Mode : HDMI 1920\*1080@60Hz Date of Test : Jan 06, 2016

& 1kHz Playing

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(µV)	Limits dB(µV)	Margin (dB)	Remark
	0.198	48.30	10.52	58.82	63.70	4.88	
	0.458	36.20	10.40	46.60	56.73	10.13	
	0.682	33.31	10.37	43.68	56.00	12.32	OD
	1.131	29.51	10.38	39.89	56.00	16.11	QP
	1.837	28.10	10.41	38.51	56.00	17.49	
Time	5.247	36.21	10.47	46.68	60.00	13.32	
Line	0.198	32.10	10.52	42.62	53.70	11.08	
	0.458	24.40	10.40	34.80	46.73	11.93	
	0.682	18.61	10.37	28.98	46.00	17.02	AV
	1.131	17.61	10.38	27.99	46.00	18.01	
	1.837	17.50	10.41	27.91	46.00	18.09	
	5.247	24.31	10.47	34.78	50.00	15.22	
	0.197	47.49	10.51	58.00	63.75	5.75	
	0.432	30.50	10.39	40.89	57.22	16.33	
	0.592	29.90	10.36	40.26	56.00	15.74	OD
	1.124	27.11	10.37	37.48	56.00	18.52	QP
	2.043	25.20	10.41	35.61	56.00	20.39	
Neutral	5.237	35.61	10.47	46.08	60.00	13.92	
Neutrai	0.197	30.79	10.51	41.30	53.75	12.45	
	0.432	16.90	10.39	27.29	47.22	19.93	AV
	0.592	18.10	10.36	28.46	46.00	17.54	
	1.124	15.81	10.37	26.18	46.00	19.82	
	2.043	14.30	10.41	24.71	46.00	21.29	
	5.237	25.91	10.47	36.38	50.00	13.62	

Model No. : LC-50N6000U Humidity : 48%RH

Test Mode : HDMI 1280\*1024@60Hz Date of Test : Jan 06, 2016

& 1kHz Playing

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(µV)	Limits dB(µV)	Margin (dB)	Remark
	0.198	48.20	10.52	58.72	63.68	4.96	
	0.458	36.30	10.40	46.70	56.73	10.03	
	0.591	32.00	10.38	42.38	56.00	13.62	OD
	1.127	29.41	10.38	39.79	56.00	16.21	QP
	2.715	25.29	10.44	35.73	56.00	20.27	
Line	5.244	35.61	10.47	46.08	60.00	13.92	
Line	0.198	32.30	10.52	42.82	53.68	10.86	
	0.458	24.40	10.40	34.80	46.73	11.93	AV
	0.591	19.10	10.38	29.48	46.00	16.52	
	1.127	17.31	10.38	27.69	46.00	18.31	
	2.715	16.19	10.44	26.63	46.00	19.37	
	5.244	22.91	10.47	33.38	50.00	16.62	
	0.197	47.60	10.50	58.10	63.72	5.62	
	0.458	32.90	10.38	43.28	56.73	13.45	
	0.605	29.40	10.36	39.76	56.00	16.24	OD
	1.123	27.31	10.37	37.68	56.00	18.32	QP
	2.132	25.60	10.41	36.01	56.00	19.99	
Neutral	5.237	35.11	10.47	45.58	60.00	14.42	
Neuman	0.197	31.40	10.50	41.90	53.72	11.82	
	0.458	21.20	10.38	31.58	46.73	15.15	AV
	0.605	17.10	10.36	27.46	46.00	18.54	
	1.123	16.01	10.37	26.38	46.00	19.62	
	2.132	14.40	10.41	24.81	46.00	21.19	
	5.237	25.71	10.47	36.18	50.00	13.82	

Model No. : LC-50N6000U Humidity : 48%RH

Test Mode : HDMI 640\*480@60Hz & Date of Test : Jan 06, 2016

1kHz Playing

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(µV)	Limits dB(µV)	Margin (dB)	Remark		
	0.196	46.89	10.53	57.42	63.79	6.37			
	0.458	32.90	10.40	43.30	56.74	13.44			
	0.612	29.40	10.38	39.78	56.00	16.22	ΩD		
Line	1.199	27.50	10.39	37.89	56.00	18.11	QP		
	1.994	26.30	10.41	36.71	56.00	19.29			
	5.509	35.50	10.48	45.98	60.00	14.02			
	0.196	30.09	10.53	40.62	53.79	13.17			
	0.458	21.00	10.40	31.40	46.74	15.34	AV		
	0.612	16.90	10.38	27.28	46.00	18.72			
	1.199	15.40	10.39	25.79	46.00	20.21			
	1.994	15.60	10.41	26.01	46.00	19.99			
	5.509	26.40	10.48	36.88	50.00	13.12			
	0.199	48.00	10.50	58.50	63.67	5.17			
	0.457	36.20	10.38	46.58	56.74	10.16			
	0.681	31.89	10.35	42.24	56.00	13.76	QP		
	1.218	28.19	10.39	38.58	56.00	17.42	Qr		
	2.795	25.10	10.43	35.53	56.00	20.47			
Neutral	5.232	36.61	10.47	47.08	60.00	12.92			
Neutrai	0.199	32.80	10.50	43.30	53.67	10.37			
	0.457	23.70	10.38	34.08	46.74	12.66			
	0.681	17.61	10.35	27.96	46.00	18.04	AV		
	1.218	16.29	10.39	26.68	46.00	19.32			
	2.795	14.60	10.43	25.03	46.00	20.97			
	5.232	27.71	10.47	38.18	50.00	11.82			

Model No. : LC-50N6000U Humidity : 48%RH

Test Mode : HDMI1080P Date of Test : Jan 06, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(µV)	Margin (dB)	Remark	
	0.198	47.70	10.52	58.22	63.69	5.47		
	0.455	32.80	10.40	43.20	56.78	13.58		
	0.598	29.60	10.38	39.98	56.00	16.02	OD	
	1.234	25.70	10.39	36.09	56.00	19.91	QP	
	2.680	23.79	10.44	34.23	56.00	21.77		
Line	5.235	34.21	10.47	44.68	60.00	15.32		
	0.198	32.30	10.52	42.82	53.69	10.87		
	0.455	21.10	10.40	31.50	46.78	15.28	AV	
	0.598	18.30	10.38	28.68	46.00	17.32		
	1.234	12.60	10.39	22.99	46.00	23.01		
	2.680	14.89	10.44	25.33	46.00	20.67		
	5.235	26.61	10.47	37.08	50.00	12.92		
	0.199	48.10	10.50	58.60	63.67	5.07		
	0.457	36.30	10.38	46.68	56.75	10.07		
	0.685	33.31	10.35	43.66	56.00	12.34	ΩD	
	1.121	28.91	10.37	39.28	56.00	16.72	QP	
	1.838	28.20	10.41	38.61	56.00	17.39		
NI ovetno 1	5.245	34.91	10.47	45.38	60.00	14.62		
Neutral	0.199	33.20	10.50	43.70	53.67	9.97		
	0.457	23.80	10.38	34.18	46.75	12.57		
	0.685	19.91	10.35	30.26	46.00	15.74	AV	
	1.121	16.41	10.37	26.78	46.00	19.22		
	1.838	17.30	10.41	27.71	46.00	18.29		
	5.245	22.81	10.47	33.28	50.00	16.72		

Model No. : LC-50N6000U Humidity : 48%RH

Test Mode : \_\_\_\_ MHL Date of Test : \_\_\_ Jan 06, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(µV)	Margin (dB)	Remark	
	0.198	47.70	10.52	58.22	63.71	5.49		
	0.450	32.60	10.41	43.01	56.87	13.86		
	0.606	29.60	10.38	39.98	56.00	16.02	OD	
Ī	1.194	28.20	10.39	38.59	56.00	17.41	QP	
	2.753	24.89	10.44	35.33	56.00	20.67		
т :	5.688	32.90	10.47	43.37	60.00	16.63	-	
Line	0.198	32.20	10.52	42.72	53.71	10.99		
	0.450	20.10	10.41	30.51	46.87	16.36	AV	
	0.606	17.50	10.38	27.88	46.00	18.12		
	1.194	16.30	10.39	26.69	46.00	19.31		
	2.753	15.49	10.44	25.93	46.00	20.07		
	5.688	21.50	10.47	31.97	50.00	18.03		
	0.199	48.00	10.50	58.50	63.67	5.17		
	0.454	35.80	10.38	46.18	56.81	10.63		
	0.680	33.11	10.35	43.46	56.00	12.54	ΩD	
	1.370	29.10	10.39	39.49	56.00	16.51	QP	
	3.557	23.90	10.45	34.35	56.00	21.65		
Neutral	5.268	35.91	10.47	46.38	60.00	13.62		
Neutrai	0.199	33.10	10.50	43.60	53.67	10.07		
	0.454	23.70	10.38	34.08	46.81	12.73		
	0.680	18.61	10.35	28.96	46.00	17.04	AV	
	1.370	15.20	10.39	25.59	46.00	20.41		
	3.557	14.80	10.45	25.25	46.00	20.75		
	5.268	25.11	10.47	35.58	50.00	14.42		

Model No. : LC-50N6000U Humidity : 48%RH

Test Mode : USB Play Date of Test : Jan 06, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(µV)	Limits dB(µV)	Margin (dB)	Remark	
	0.196	47.40	10.52	57.92	63.77	5.85		
	0.453	32.60	10.40	43.00	56.81	13.81		
	0.685	30.31	10.37	40.68	56.00	15.32	OD	
	1.189	28.31	10.38	38.69	56.00	17.31	QP	
	2.711	25.49	10.44	35.93	56.00	20.07		
Time	5.261	34.31	10.47	44.78	60.00	15.22	1	
Line -	0.196	31.60	10.52	42.12	53.77	11.65		
	0.453	20.70	10.40	31.10	46.81	15.71	AV	
	0.685	17.91	10.37	28.28	46.00	17.72		
	1.189	16.41	10.38	26.79	46.00	19.21		
	2.711	16.39	10.44	26.83	46.00	19.17		
	5.261	22.81	10.47	33.28	50.00	16.72		
	0.198	48.10	10.50	58.60	63.70	5.10		
	0.453	35.70	10.38	46.08	56.82	10.74		
	0.604	30.50	10.36	40.86	56.00	15.14	OD	
	1.213	28.29	10.39	38.68	56.00	17.32	QP	
	2.569	25.21	10.42	35.63	56.00	20.37		
Neutral	5.258	33.51	10.47	43.98	60.00	16.02		
Neutrai	0.198	32.60	10.50	43.10	53.70	10.60		
	0.453	23.80	10.38	34.18	46.82	12.64		
	0.604	18.60	10.36	28.96	46.00	17.04	AV	
	1.213	16.59	10.39	26.98	46.00	19.02		
	2.569	16.11	10.42	26.53	46.00	19.47		
	5.258	22.21	10.47	32.68	50.00	17.32		

Model No. : LC-50N6000U Humidity : 48%RH

Test Mode : LAN Play Date of Test : Jan 06, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(µV)	Limits dB(µV)	Margin (dB)	Remark	
	0.199	47.60	10.52	58.12	63.64	5.52		
	0.453	32.60	10.40	43.00	56.82	13.82		
	0.587	28.60	10.38	38.98	56.00	17.02	ΩD	
	1.369	26.80	10.39	37.19	56.00	18.81	QP	
	2.781	26.59	10.44	37.03	56.00	18.97		
Time	5.285	35.11	10.47	45.58	60.00	14.42		
Line -	0.199	32.80	10.52	43.32	53.64	10.32		
	0.453	20.50	10.40	30.90	46.82	15.92	AV	
	0.587	16.10	10.38	26.48	46.00	19.52		
	1.369	14.90	10.39	25.29	46.00	20.71		
	2.781	15.29	10.44	25.73	46.00	20.27		
	5.285	23.71	10.47	34.18	50.00	15.82	i	
	0.198	48.10	10.50	58.60	63.69	5.09		
	0.455	36.10	10.38	46.48	56.78	10.30		
	0.685	33.41	10.35	43.76	56.00	12.24	ΩD	
	1.202	28.59	10.39	38.98	56.00	17.02	QP	
	2.723	25.20	10.43	35.63	56.00	20.37		
Neutral	5.296	33.41	10.47	43.88	60.00	16.12		
Neutrai	0.198	32.80	10.50	43.30	53.69	10.39		
	0.455	24.20	10.38	34.58	46.78	12.20		
	0.685	19.91	10.35	30.26	46.00	15.74	AX7	
	1.202	16.39	10.39	26.78	46.00	19.22	AV	
	2.723	16.10	10.43	26.53	46.00	19.47		
	5.296	26.31	10.47	36.78	50.00	13.22		

# 4 RADIATED EMISSION TEST

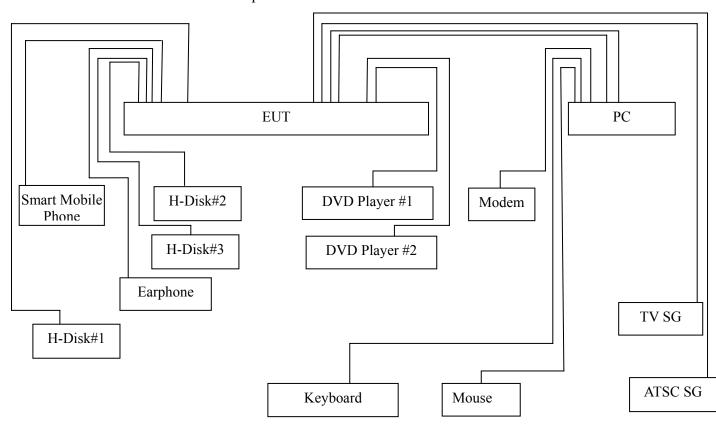
# 4.1 Test Equipment

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	101303	May 07, 2015	May 06, 2016
2.	Preamplifier	Agilent	8447D	2944A06664	Apr 27, 2015	Apr 26, 2016
3.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2015	Sep 19, 2016
4.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 15, 2015	May 14, 2016
5.	Horn Antenna	EMCO	3115	9607-4878	Jun 03, 2015	Jun 02, 2016
6.	Spectrum	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016
7.	Spectrum	HP	8591EM	3628A00908	May 07, 2015	May 06, 2016
8.	50Ω Coaxial Switch	Anritsu	MP59B	6200426390	Sep 18, 2015	Mar 17, 2016
9.	Software	Audix	E3	6.2007-9-10		

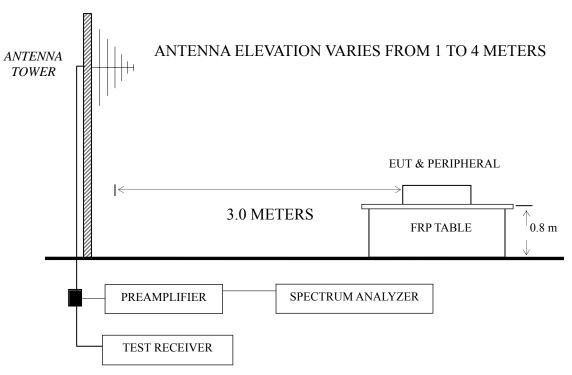
# 4.2 Block Diagram of Test Setup

# 4.2.1 EUT & Peripherals



## 4.2.2 Test Setup

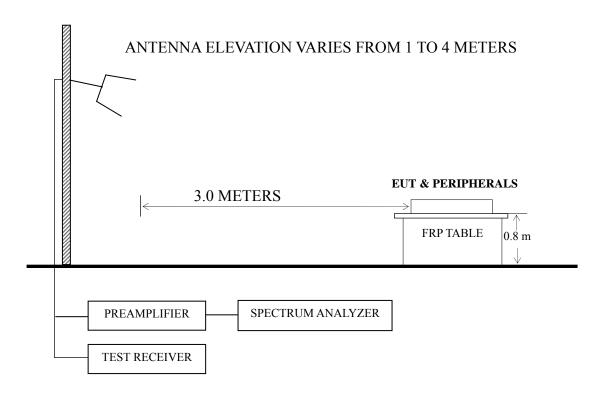
## 4.2.2.1 Below 1GHz



: 50 ohm Coaxial Switch

4.2.2.2 Above 1GHz

## **BORE-SIGHT ANTENNA TOWER**



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

Frequency	Distance	Field strength limits				
(MHz)	(m)	(µV/m)	dB (μV/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 ( $\mu$ V/m) = 20 log Emission Level ( $\mu$ 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 6 GHz was checked for the maximum resolution test mode.

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 3840*2160@60Hz & 1kHz playing	P26 - P27
HDMI 1920*1080@60Hz & 1kHz playing	P28
HDMI 1280*1024@60Hz & 1kHz playing	P29
HDMI 640*480@60Hz & 1kHz playing	P30
HDMI1080P	P31
MHL	P32
USB Play	P33
LAN Play	P34

- 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  $3-0^{\circ}$  was the table front facing the antenna. Degree is calculated from  $0^{\circ}$  clockwise facing the antenna.
- NOTE 4 The worst case is for HDMI 3840\*2160@60Hz & 1kHz playing test mode. The worst emission at horizontal polarization was detected at 852.56 MHz with corrected signal level of 43.93 dB ( $\mu$ V/m) (limit is 46.00 dB ( $\mu$ V/m)), when the antenna was 2.0 m height and the turntable was at 70°. The worst emission at vertical polarization was detected at 313.240 MHz with corrected signal level of 43.82 dB ( $\mu$ V/m) (limit is 46.00 dB ( $\mu$ V/m)), when the antenna was 1.8m height and the turntable was at 320°.

Model No. : LC-50N6000U Humidity : 60%RH

Test Mode : HDMI 3840\*2160@60Hz Date of Test : Jan 12, 2015

& 1kHz Playing

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (µV/m)	Limits dB ( $\mu V/m$ )	Margin (dB)	Remark		
	78.500	9.12	26.97	1.05		37.14	40.00	2.86			
	132.820	12.69	25.77	1.54		40.00	43.50	3.50			
	235.640	11.48	29.30	2.10		42.88	46.00	3.12	OD		
	310.200	14.10	27.00	2.60		43.70	46.00	2.30	QP		
	852.560	20.73	19.03	4.17		43.93	46.00	2.07			
	891.000	21.30	17.30	4.46		43.06	46.00	2.94			
	1187.688	24.40	66.52	3.52	36.16	58.28	74.00	15.72			
	1687.408	26.38	63.82	4.07	35.44	58.83	74.00	15.17			
Horizontal	2547.974	28.63	62.96	4.96	35.16	61.39	74.00	12.61	PK		
	2956.525	30.33	63.71	5.69	35.20	64.53	74.00	9.47	ГK		
	3375.707	31.27	58.65	6.10	34.83	61.19	74.00	12.81			
	4385.052	33.42	50.95	6.67	34.14	56.90	74.00	17.10			
	1187.688	24.40	50.21	3.52	36.16	41.97	54.00	12.03			
	1687.408	26.38	45.22	4.07	35.44	40.23	54.00	13.77			
	2547.974	28.63	45.59	4.96	35.16	44.02	54.00	9.98	AXI		
	2956.525	30.33	44.03	5.69	35.20	44.85	54.00	9.15	AV		
	3375.707	31.27	40.11	6.10	34.83	42.65	54.00	11.35	1		
	4385.052	33.42	32.11	6.67	34.14	38.06	54.00	15.94			

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-50N6000U Humidity : 60%RH

Test Mode : HDMI 3840\*2160@60Hz Date of Test : Jan 12, 2015

& 1kHz Playing

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		
	39.800	12.95	20.00	0.73		33.68	40.00	6.32			
	76.120	8.73	25.00	1.02		34.75	40.00	5.25			
	135.730	12.59	26.46	1.55		40.60	43.50	2.90	OD		
	313.240	14.25	26.96	2.61		43.82	46.00	2.18	QP		
	669.500	19.60	20.00	3.16		42.76	46.00	3.24			
	742.950	19.97	19.64	3.60		43.21	46.00	2.79			
	1213.502	24.51	65.01	3.54	36.11	56.95	74.00	17.05			
	1777.406	26.72	64.75	4.13	35.34	60.26	74.00	13.74	DIZ		
Vertical	2557.121	28.67	65.85	4.96	35.16	64.32	74.00	9.68			
	2972.460	30.40	67.00	5.76	35.20	67.96	74.00	6.04	PK		
	3375.707	31.27	56.41	6.10	34.83	58.95	74.00	15.05			
	4245.883	33.20	47.13	6.31	34.19	52.45	74.00	21.55			
	1213.502	24.51	48.23	3.54	36.11	40.17	54.00	13.83			
	1777.406	26.72	48.22	4.13	35.34	43.73	54.00	10.27			
	2557.121	28.67	47.11	4.96	35.16	45.58	54.00	8.42	A 3.7		
	2972.460	30.40	43.22	5.76	35.20	44.18	54.00	9.82	AV		
	3375.707	31.27	40.21	6.10	34.83	42.75	54.00	11.25			
	4245.883	33.20	32.12	6.31	34.19	37.44	54.00	16.56			

Model No. : LC-50N6000U Humidity : 60%RH

Test Mode : HDMI 1920\*1080@60Hz Date of Test : Jan 12, 2015

& 1kHz Playing

		ı	I	1			
	Eraguanav	Meter	Antenna	Cable	Emission	Limits	Margin
Polarization	Frequency (MHz)	Reading	Factor	Loss	Level dB	dB	_
	(IVIIIZ)	dB (µV)	(dB/m)	(dB)	$(\mu V/m)$	$(\mu V/m)$	(dB)
	78.500	9.12	24.65	1.05	34.82	40.00	5.18
	313.240	14.25	25.30	2.61	42.16	46.00	3.84
Horizontal	367.560	16.23	23.71	2.68	42.62	46.00	3.38
поптенца	667.290	19.60	18.66	3.16	41.42	46.00	4.58
	845.770	20.73	18.30	4.07	43.10	46.00	2.90
	890.100	21.30	17.30	4.46	43.06	46.00	2.94
	41.640	12.41	23.72	0.75	36.88	40.00	3.12
	78.500	9.12	25.96	1.05	36.13	40.00	3.87
Vertical	131.850	12.71	24.19	1.53	38.43	43.50	5.07
vertical	313.240	14.25	24.47	2.61	41.33	46.00	4.67
	672.140	19.60	18.82	3.16	41.58	46.00	4.42
	890.040	21.30	15.40	4.46	41.16	46.00	4.84

EUT : LED LCD TV Temperature :  $22^{\circ}$ C

Model No. : LC-50N6000U Humidity :  $60^{\circ}$ RH

Test Mode : HDMI 1280\*1024@60Hz Date of Test : Jan 12, 2015 & 1kHz Playing

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)		Emission Level dB (µV/m)	Limits $dB$ $(\mu V/m)$	Margin (dB)
	43.580	11.89	20.06	0.76	32.71	40.00	7.29
	64.920	6.50	27.22	0.90	34.62	40.00	5.38
Horizontal	143.490	12.20	24.54	1.60	38.34	43.50	5.16
попідопіаї	187.140	10.41	27.05	1.88	39.34	43.50	4.16
	233.700	11.36	28.29	2.10	41.75	46.00	4.25
	319.060	14.45	22.96	2.62	40.03	46.00	5.97
	54.250	6.66	27.04	0.84	34.54	40.00	5.46
	77.530	8.95	25.71	1.05	35.71	40.00	4.29
Vertical	157.070	11.16	26.44	1.68	39.28	43.50	4.22
Vertical	237.580	11.64	27.72	2.11	41.47	46.00	4.53
	579.020	18.50	20.23	2.42	41.15	46.00	4.85
	650.800	19.75	18.11	2.90	40.76	46.00	5.24

EUT : LED LCD TV Temperature :  $22^{\circ}$ C

Model No. : LC-50N6000U Humidity :  $60^{\circ}$ RH

Test Mode : HDMI 640\*480@60Hz & Date of Test : Jan 12, 2015

1kHz Playing

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)		Emission Level dB (µV/m)	Limits dB ( $\mu V/m$ )	Margin (dB)
	86.260	9.95	23.63	1.16	34.74	40.00	5.26
	140.580	12.45	25.57	1.59	39.61	43.50	3.89
Horizontal	195.870	10.03	26.36	1.94	38.33	43.50	5.17
Пописний	315.180	14.30	22.71	2.61	39.62	46.00	6.38
	465.530	17.22	21.90	2.87	41.99	46.00	4.01
	800.180	20.60	16.95	3.68	41.23	46.00	4.77
	49.400	7.99	25.74	0.80	34.53	40.00	5.47
Vertical	61.040	6.26	28.65	0.88	35.79	40.00	4.21
	166.770	11.19	25.25	1.75	38.19	43.50	5.31
	255.040	12.70	22.73	2.22	37.65	46.00	8.35
	342.340	15.24	19.56	2.65	37.45	46.00	8.55
	495.600	17.78	20.40	2.93	41.11	46.00	4.89

EUT : LED LCD TV Temperature :  $22^{\circ}$ C

Model No. : LC-50N6000U Humidity :  $60^{\circ}$ RH

Test Mode : HDMI1080P Date of Test : Jan 12, 2015

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)
	89.170	10.35	23.90	1.20	35.45	43.50	8.05
	240.490	11.90	25.57	2.13	39.60	46.00	6.40
Horizontal	289.960	13.60	22.22	2.49	38.31	46.00	7.69
Horizontai	373.380	16.36	21.96	2.69	41.01	46.00	4.99
	596.480	18.98	20.16	2.31	41.45	46.00	4.55
	711.910	19.82	17.86	3.56	41.24	46.00	4.76
	84.320	9.74	25.10	1.13	35.97	40.00	4.03
	183.260	10.50	25.09	1.87	37.46	43.50	6.04
Vertical	316.150	14.35	23.94	2.61	40.90	46.00	5.10
	499.480	17.90	17.43	2.94	38.27	46.00	7.73
	697.360	19.77	17.48	3.54	40.79	46.00	5.21
	902.030	21.30	14.48	4.56	40.34	46.00	5.66

EUT : LED LCD TV Temperature :  $22^{\circ}$ C

Model No. : LC-50N6000U Humidity :  $60^{\circ}$ RH

Test Mode : MHL Date of Test : Jan 12, 2015

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)		Emission Level dB (µV/m)	Limits dB ( $\mu V/m$ )	Margin (dB)
	119.240	12.79	22.17	1.45	36.41	43.50	7.09
	191.020	10.27	24.39	1.92	36.58	43.50	6.92
Horizontal	258.920	13.00	20.38	2.25	35.63	46.00	10.37
Пописний	407.330	16.60	18.96	2.73	38.29	46.00	7.71
	733.250	20.03	12.33	3.59	35.95	46.00	10.05
	838.980	20.80	13.68	4.07	38.55	46.00	7.45
	95.960	11.84	23.47	1.27	36.58	43.50	6.92
Vertical	145.430	12.03	24.71	1.61	38.35	43.50	5.15
	321.970	14.54	20.72	2.62	37.88	46.00	8.12
	418.000	16.76	17.57	2.76	37.09	46.00	8.91
	462.620	17.14	17.63	2.87	37.64	46.00	8.36
	650.800	19.75	15.34	2.90	37.99	46.00	8.01

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-50N6000U Humidity : 60%RH

Test Mode : USB Play Date of Test : Jan 12, 2015

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)		Emission Level dB (µV/m)	Limits dB (µV/m)	Margin (dB)
	63.950	6.44	27.24	0.90	34.58	40.00	5.42
	86.260	9.95	23.02	1.16	34.13	40.00	5.87
TT	151.250	11.43	23.11	1.65	36.19	43.50	7.31
Horizontal	250.190	12.50	21.35	2.15	36.00	46.00	10.00
	370.470	16.33	18.46	2.68	37.47	46.00	8.53
	457.770	17.04	18.31	2.85	38.20	46.00	7.80
	34.850	15.80	16.22	0.68	32.70	40.00	7.30
Vertical	43.580	11.89	21.05	0.76	33.70	40.00	6.30
	54.250	6.66	25.04	0.84	32.54	40.00	7.46
	131.850	12.71	23.70	1.53	37.94	43.50	5.56
	155.130	11.20	24.09	1.66	36.95	43.50	6.55
	573.200	18.35	17.26	2.47	38.08	46.00	7.92

EUT : LED LCD TV Temperature :  $22^{\circ}$ C

Model No. : LC-50N6000U Humidity :  $60^{\circ}$ RH

Date of Test:

Antenna Cable Emission Limits Meter Frequency Margin Polarization Reading Factor Loss Level dB dB (MHz) (dB) dB (µV) (dB)  $(\mu V/m)$ (dB/m) $(\mu V/m)$ 71.710 7.68 25.51 0.96 34.15 40.00 5.85 106.630 12.54 22.76 1.38 36.68 43.50 6.82 26.38 159.980 11.10 1.70 39.18 43.50 4.32 Horizontal 182.290 10.50 26.52 1.85 38.87 43.50 4.63 429.640 16.80 19.60 2.79 39.19 46.00 6.81 534.400 7.30 18.40 17.62 2.68 38.70 46.00 47.460 9.11 23.09 0.79 32.99 40.00 7.01 87.230 10.10 23.43 1.18 34.71 40.00 5.29 191.020 10.27 24.45 1.92 36.64 43.50 6.86 Vertical 224.970 39.55 10.80 26.68 2.07 46.00 6.45 436.430 16.88 19.48 2.81 39.17 46.00 6.83 711.910 19.82 15.16 3.56 38.54 46.00 7.46

LAN Play

Test Mode

TEST ENGINEER: BILL WU

Jan 12, 2015

## **5 DEBUG DESCRIPTION**

The following components are used during the countermeasure procedures:

Name	M/N	Manufacturer	Location	
Ferrite Core	ZCAT1519-0830	Jiangsu Ruifeng Electronics Co., Ltd	See Appendix Figure 28	
SMcontact	SMR-TSL-4-3.5-5R	Qingdao Joinset Co., Ltd	See Appendix Figure 29	

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:

(WENCY YANG)

6	DEVI	ATION TO	TEST	<b>SPECIFICA</b>	TIONS
1,		<b> </b>		178 878 288 877	

None.