

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

LED LCD TV

Model No.	Brand
55K20DGW, 55K21DGW, 55K22DGW, 55K23DGW, 55K24DGW, 55K25DGW	Hisense
55H5G, 55H5CG	

FCC ID : W9HLCDF0037

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

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Report No. : ACI-F14036  
Date of Test : Feb 17, 2014  
Date of Report : Mar 07, 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 Feb 17, 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.F14035, a Verification report.***

Date of Test : Feb 17, 2014 Date of Report : Mar 07, 2014

Producer :   
 EMILY ZHU / Assistant

Review :   
 DIAO 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	:	<input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-product <input type="checkbox"/> Pro-type
Model No.	:	55K20DGW, 55K21DGW, 55K22DGW, 55K23DGW, 54K21DGW, 55K25DGW, 55H5G, 55H5CG
Note	:	The above models are all the same except for model name. 55K20DGW model is tested and recorded in the report.
Brand Name	:	Hisense
Applicant	:	Hisense Electric Co., Ltd. No.218 Qianwangang Road, Economy & Technology Development Zone, Qingdao, China
Manufacturer	:	Hisense Electric Co., Ltd. No.218 Qianwangang Road, Economy & Technology Development Zone, Qingdao, China
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 : HD550DF-B57
Max Resolution	:	1920*1080@60Hz
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 HDMI2 Port : Connected with DVD PLAYER#2
- (2) One HDMI3/ARC Port : Connected with DVD PLAYER#1
- (3) One DIGITAL AUDIO OUT Port : Connected with DVD PLAYER #2
- (4) One component of Audio/YPbPr Audio Port : Connected with DVD PLAYER#1
- (5) One component of Video/YPbPr Port : Connected with DVD PLAYER#1
- (6) One LAN Port : Connected with PC

## Side Port:

- (1) Two USB Ports : Connected with U-Disk
- (2) One HDMI1/DVI Port : Connected with PC
- (3) One VGA Port : Connected with PC
- (4) One AUDIO IN Port : Connected with PC
- (5) One AUDIO OUT/Earphone Port : Connected with Earphone
- (6) One ANT/CABLE IN Port : Connected with Antenna or ATSC SG / TV SG

## 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 : 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#1

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

### 2.2.9 DVD PLAYER #2

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

### 2.2.10 Earphone#1

Manufacturer : Skullcandy  
Model Number : FMJ

## 2.2.11 Earphone#2

Manufacturer : audio-technica  
Model Number : ATH-CKL200

## 2.2.12 U-DISK\*2

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

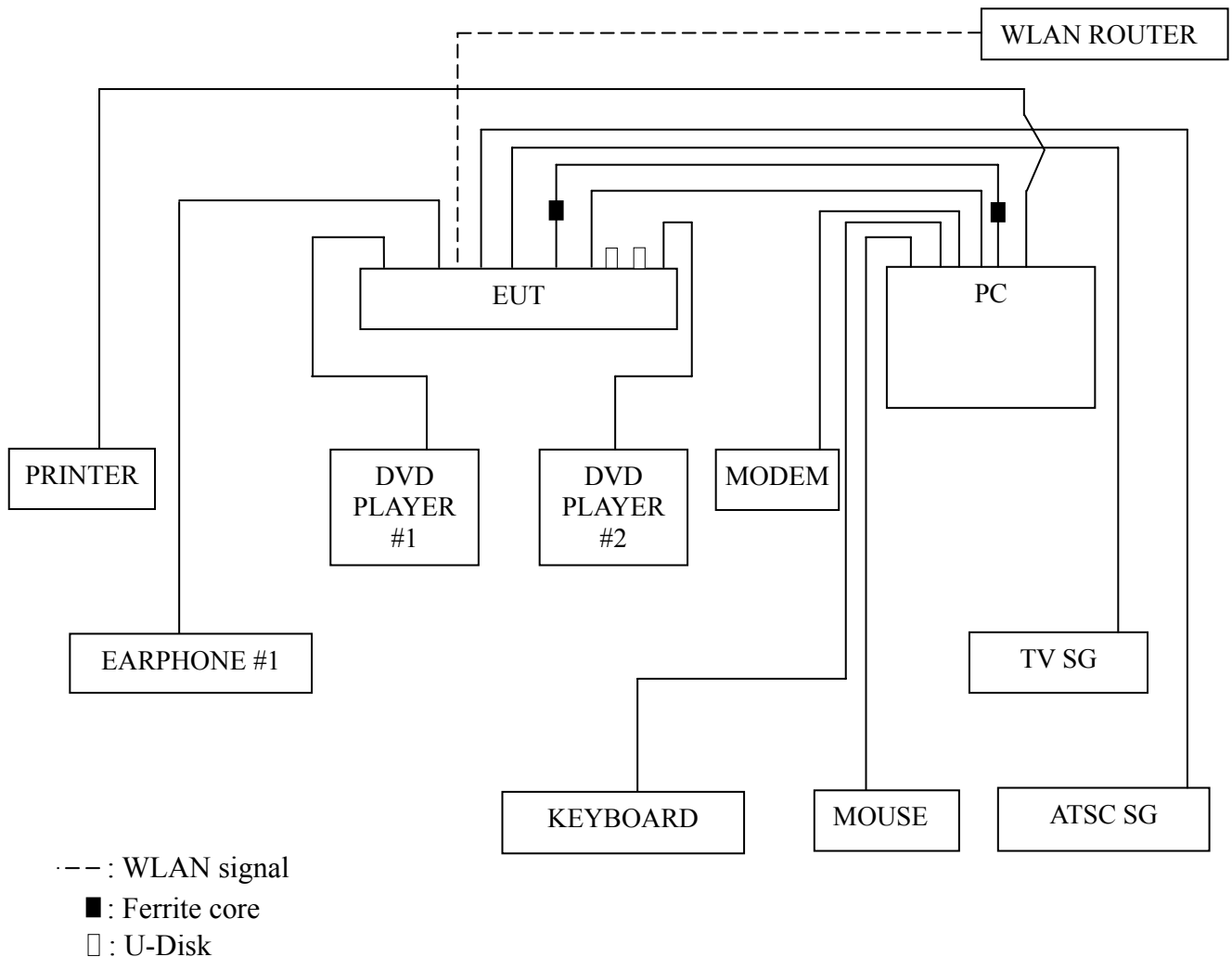
#### 3.1 Test Equipment

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

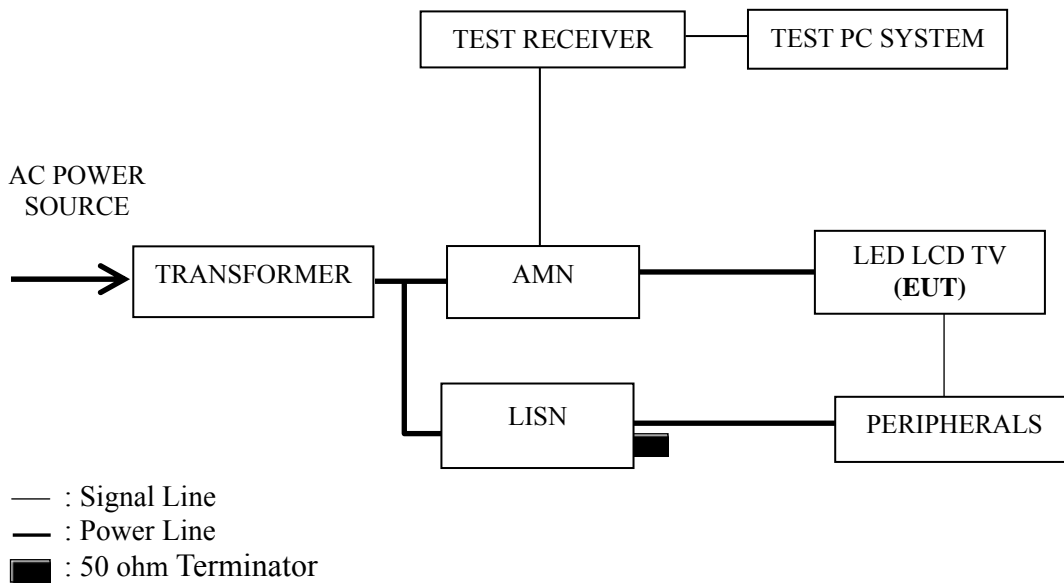
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Mar 20, 2013	Mar 19, 2014
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 25, 2013	Feb 24, 2014
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 20, 2013	Mar 19, 2014
4.	50 $\Omega$ Coaxial Switch	Anritsu	MP59B	6200426389	Sep 18, 2013	Mar 17, 2014
5.	50 $\Omega$ Terminator	Anritsu	BNC	001	Mar 20, 2013	Mar 19, 2014
6.	Software	Audix	E3	6.2009-1-15	--	--

#### 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 ( $\mu$ 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 D-Sub & 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 WLAN function is operating to communicate with WLAN router.
- 3.5.8 The other peripherals devices were driven and operated during the test.
- 3.5.9 The test modes are as follows:

Test Mode
D-Sub 1920*1080@60Hz
HDMI 1920*1080@60Hz
D-Sub 1280*1024@60Hz
D-Sub 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
D-Sub 1920*1080@60Hz	P13
HDMI 1920*1080@60Hz	P14
D-Sub 1280*1024@60Hz	P15
D-Sub 640*480@60Hz	P16
USB Play	P17
LAN Play	P18

NOTE 1 – Factor = Cable Loss + AMN Factor.

NOTE 2 – Emission Level = Meter Reading + Factor.

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

NOTE 4 – The worst case is for D-Sub 1920\*1080@60Hz test mode. The worst emission is detected at 6.810 MHz (Average Value) with corrected signal level of 39.85 dB ( $\mu$ V) (limit is 50.00 dB ( $\mu$ V)), when the Line of the EUT is connected to AMN.

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 48%RH

Test Mode : D-Sub 1920\*1080@60Hz Date of Test : Feb 17, 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	0.235	37.80	0.09	37.89	62.29	24.40	QP
	0.445	33.90	-0.03	33.87	56.96	23.09	
	0.579	35.80	0.02	35.82	56.00	20.18	
	1.166	36.39	0.06	36.45	56.00	19.55	
	1.918	34.10	0.08	34.18	56.00	21.82	
	6.810	40.10	0.25	40.35	60.00	19.65	
	0.235	22.50	0.09	22.59	52.29	29.70	AV
	0.445	19.80	-0.03	19.77	46.96	27.19	
	0.579	25.20	0.02	25.22	46.00	20.78	
	1.166	27.89	0.06	27.95	46.00	18.05	
	1.918	23.60	0.08	23.68	46.00	22.32	
	<b>6.810</b>	<b>39.60</b>	<b>0.25</b>	<b>39.85</b>	<b>50.00</b>	<b>10.15</b>	
Neutral	0.245	40.01	0.20	40.21	61.92	21.71	QP
	0.390	36.60	0.21	36.81	58.06	21.25	
	0.599	34.90	0.16	35.06	56.00	20.94	
	1.810	35.10	0.17	35.27	56.00	20.73	
	4.672	34.00	0.22	34.22	56.00	21.78	
	6.890	40.89	0.33	41.22	60.00	18.78	
	0.245	22.41	0.20	22.61	51.92	29.31	AV
	0.390	24.90	0.21	25.11	48.06	22.95	
	0.599	24.00	0.16	24.16	46.00	21.84	
	1.810	25.90	0.17	26.07	46.00	19.93	
	4.672	27.30	0.22	27.52	46.00	18.48	
	6.890	37.59	0.33	37.92	50.00	12.08	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 48%RH

Test Mode : HDMI 1920\*1080@60Hz Date of Test : Feb 17, 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	0.230	37.61	0.09	37.70	62.44	24.74	QP
	0.389	35.90	0.00	35.90	58.08	22.18	
	0.573	36.79	0.02	36.81	56.00	19.19	
	0.953	36.20	0.06	36.26	56.00	19.74	
	1.800	35.60	0.07	35.67	56.00	20.33	
	6.878	40.70	0.26	40.96	60.00	19.04	
	0.230	23.01	0.09	23.10	52.44	29.34	AV
	0.389	25.00	0.00	25.00	48.08	23.08	
	0.573	26.19	0.02	26.21	46.00	19.79	
	0.953	27.60	0.06	27.66	46.00	18.34	
	1.800	26.90	0.07	26.97	46.00	19.03	
	6.878	35.10	0.26	35.36	50.00	14.64	
Neutral	0.242	39.71	0.20	39.91	62.04	22.13	QP
	0.389	36.80	0.21	37.01	58.08	21.07	
	0.522	35.90	0.20	36.10	56.00	19.90	
	1.153	36.59	0.18	36.77	56.00	19.23	
	1.781	37.10	0.17	37.27	56.00	18.73	
	7.025	40.70	0.33	41.03	60.00	18.97	
	0.242	21.41	0.20	21.61	52.04	30.43	AV
	0.389	25.40	0.21	25.61	48.08	22.47	
	0.522	28.30	0.20	28.50	46.00	17.50	
	1.153	27.89	0.18	28.07	46.00	17.93	
	1.781	27.90	0.17	28.07	46.00	17.93	
	<b>7.025</b>	<b>36.30</b>	<b>0.33</b>	<b>36.63</b>	<b>50.00</b>	<b>13.37</b>	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 48%RH

Test Mode : D-Sub 1280\*1024@60Hz Date of Test : Feb 17, 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	0.228	37.50	0.10	37.60	62.52	24.92	QP
	0.389	35.70	0.00	35.70	58.08	22.38	
	0.611	35.30	0.04	35.34	56.00	20.66	
	1.043	36.80	0.05	36.85	56.00	19.15	
	1.819	36.90	0.07	36.97	56.00	19.03	
	6.951	41.00	0.26	41.26	60.00	18.74	
	0.228	22.60	0.10	22.70	52.52	29.82	AV
	0.389	25.10	0.00	25.10	48.08	22.98	
	0.611	25.70	0.04	25.74	46.00	20.26	
	1.043	26.10	0.05	26.15	46.00	19.85	
	1.819	28.00	0.07	28.07	46.00	17.93	
<b>6.951</b>	<b>35.80</b>	<b>0.26</b>	<b>36.06</b>	<b>50.00</b>	<b>13.94</b>		
Neutral	0.244	39.91	0.20	40.11	61.95	21.84	QP
	0.389	36.60	0.21	36.81	58.08	21.27	
	0.611	35.50	0.15	35.65	56.00	20.35	
	0.933	34.40	0.17	34.57	56.00	21.43	
	1.819	37.30	0.17	37.47	56.00	18.53	
	6.878	40.39	0.33	40.72	60.00	19.28	
	0.244	22.81	0.20	23.01	51.95	28.94	AV
	0.389	25.80	0.21	26.01	48.08	22.07	
	0.611	26.10	0.15	26.25	46.00	19.75	
	0.933	23.10	0.17	23.27	46.00	22.73	
	1.819	28.10	0.17	28.27	46.00	17.73	
6.878	35.09	0.33	35.42	50.00	14.58		

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 48%RH

Test Mode : D-Sub 640\*480@60Hz Date of Test : Feb 17, 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	0.233	37.81	0.09	37.90	62.35	24.45	QP
	0.435	34.20	-0.02	34.18	57.15	22.97	
	0.641	35.70	0.06	35.76	56.00	20.24	
	0.943	37.70	0.06	37.76	56.00	18.24	
	2.396	34.50	0.09	34.59	56.00	21.41	
	7.100	41.10	0.26	41.36	60.00	18.64	
	AV	0.233	24.51	0.09	24.60	52.35	27.75
		0.435	21.30	-0.02	21.28	47.15	25.87
		0.641	26.80	0.06	26.86	46.00	19.14
		0.943	29.60	0.06	29.66	46.00	16.34
2.396		27.00	0.09	27.09	46.00	18.91	
<b>7.100</b>		<b>35.80</b>	<b>0.26</b>	<b>36.06</b>	<b>50.00</b>	<b>13.94</b>	
Neutral	0.244	39.91	0.20	40.11	61.95	21.84	QP
	0.391	36.70	0.21	36.91	58.05	21.14	
	0.524	35.91	0.19	36.10	56.00	19.90	
	1.160	36.69	0.18	36.87	56.00	19.13	
	2.422	35.70	0.16	35.86	56.00	20.14	
	6.951	40.70	0.33	41.03	60.00	18.97	
	AV	0.244	23.11	0.20	23.31	51.95	28.64
		0.391	25.40	0.21	25.61	48.05	22.44
		0.524	29.21	0.19	29.40	46.00	16.60
		1.160	27.99	0.18	28.17	46.00	17.83
2.422		27.80	0.16	27.96	46.00	18.04	
	6.951	35.60	0.33	35.93	50.00	14.07	

TEST ENGINEER: ERIC TANG



EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 48%RH

Test Mode : USB Play Date of Test : Feb 17, 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	0.204	36.69	0.12	36.81	63.45	26.64	QP
	0.426	33.99	-0.01	33.98	57.33	23.35	
	0.631	36.20	0.06	36.26	56.00	19.74	
	1.032	37.20	0.05	37.25	56.00	18.75	
	1.819	38.20	0.07	38.27	56.00	17.73	
	6.878	41.20	0.26	41.46	60.00	18.54	
	AV	0.204	28.29	0.12	28.41	53.45	25.04
		0.426	21.59	-0.01	21.58	47.33	25.75
		0.631	27.80	0.06	27.86	46.00	18.14
		1.032	25.80	0.05	25.85	46.00	20.15
		1.819	29.00	0.07	29.07	46.00	16.93
		6.878	36.00	0.26	36.26	50.00	13.74
Neutral	0.250	40.01	0.20	40.21	61.75	21.54	QP
	0.390	36.80	0.21	37.01	58.06	21.05	
	0.535	37.20	0.19	37.39	56.00	18.61	
	0.934	35.40	0.17	35.57	56.00	20.43	
	1.801	38.50	0.17	38.67	56.00	17.33	
	6.963	42.40	0.33	42.73	60.00	17.27	
	AV	0.250	25.21	0.20	25.41	51.75	26.34
		0.390	26.00	0.21	26.21	48.06	21.85
		0.535	30.00	0.19	30.19	46.00	15.81
		0.934	24.50	0.17	24.67	46.00	21.33
		1.801	29.30	0.17	29.47	46.00	16.53
		<b>6.963</b>	<b>37.10</b>	<b>0.33</b>	<b>37.43</b>	<b>50.00</b>	<b>12.57</b>

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 48%RH

Test Mode : LAN Play Date of Test : Feb 17, 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	0.172	40.91	0.13	41.04	64.88	23.84	QP
	0.467	34.70	-0.04	34.66	56.57	21.91	
	1.152	39.09	0.06	39.15	56.00	16.85	
	1.812	38.80	0.07	38.87	56.00	17.13	
	3.241	36.01	0.13	36.14	56.00	19.86	
	7.100	41.70	0.26	41.96	60.00	18.04	
	AV	0.172	26.81	0.13	26.94	54.88	27.94
		0.467	24.60	-0.04	24.56	46.57	22.01
		1.152	30.59	0.06	30.65	46.00	15.35
		1.812	29.60	0.07	29.67	46.00	16.33
		3.241	27.81	0.13	27.94	46.00	18.06
		<b>7.100</b>	<b>36.60</b>	<b>0.26</b>	<b>36.86</b>	<b>50.00</b>	<b>13.14</b>
Neutral	0.241	39.71	0.20	39.91	62.07	22.16	QP
	0.466	34.70	0.21	34.91	56.58	21.67	
	0.621	34.60	0.15	34.75	56.00	21.25	
	1.153	38.19	0.18	38.37	56.00	17.63	
	2.622	36.80	0.17	36.97	56.00	19.03	
	6.878	41.49	0.33	41.82	60.00	18.18	
	AV	0.241	24.81	0.20	25.01	52.07	27.06
		0.466	24.20	0.21	24.41	46.58	22.17
		0.621	25.30	0.15	25.45	46.00	20.55
		1.153	30.09	0.18	30.27	46.00	15.73
		2.622	27.70	0.17	27.87	46.00	18.13
		6.878	36.09	0.33	36.42	50.00	13.58

TEST ENGINEER: ERIC TANG

## 4 RADIATED EMISSION TEST

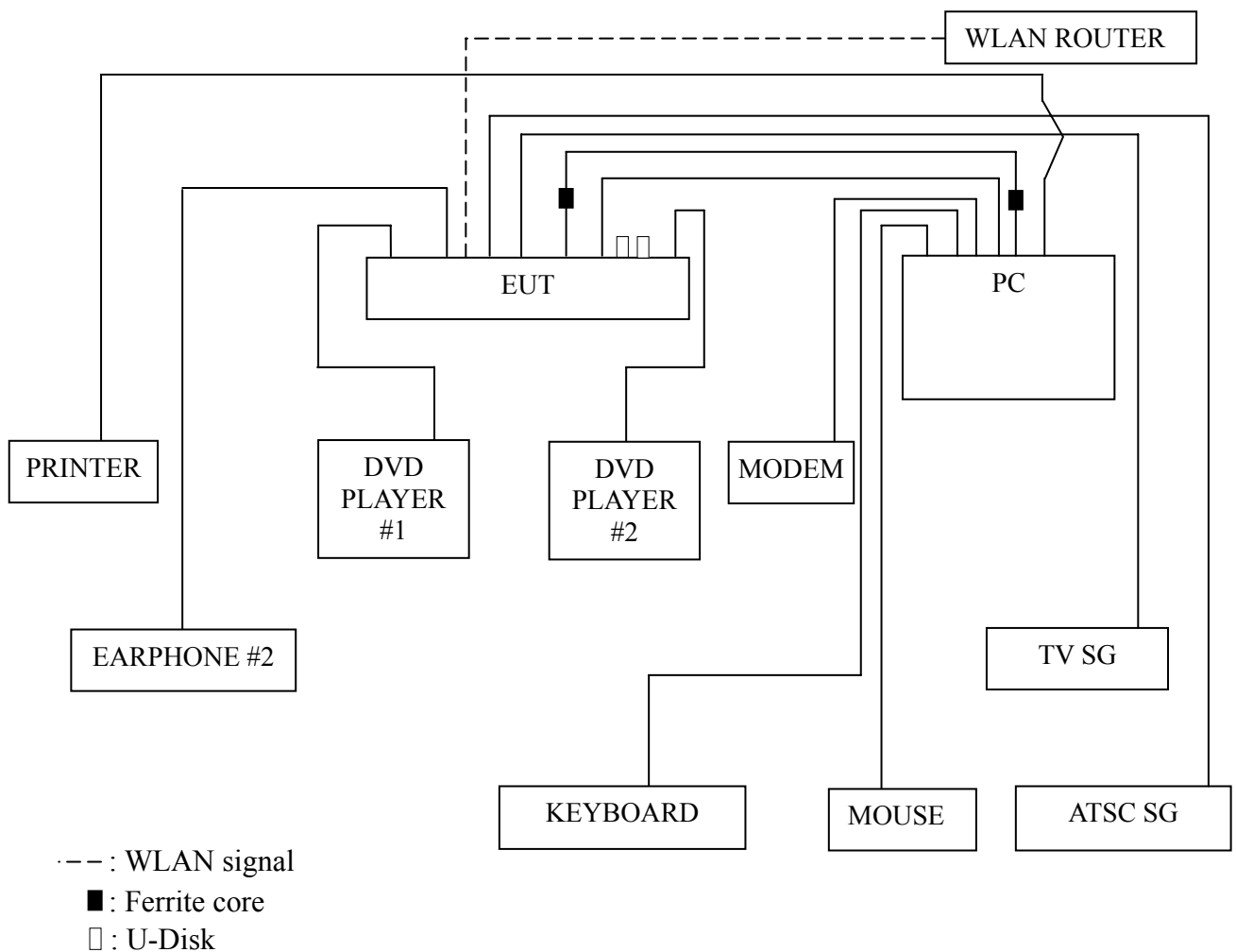
### 4.1 Test Equipment

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

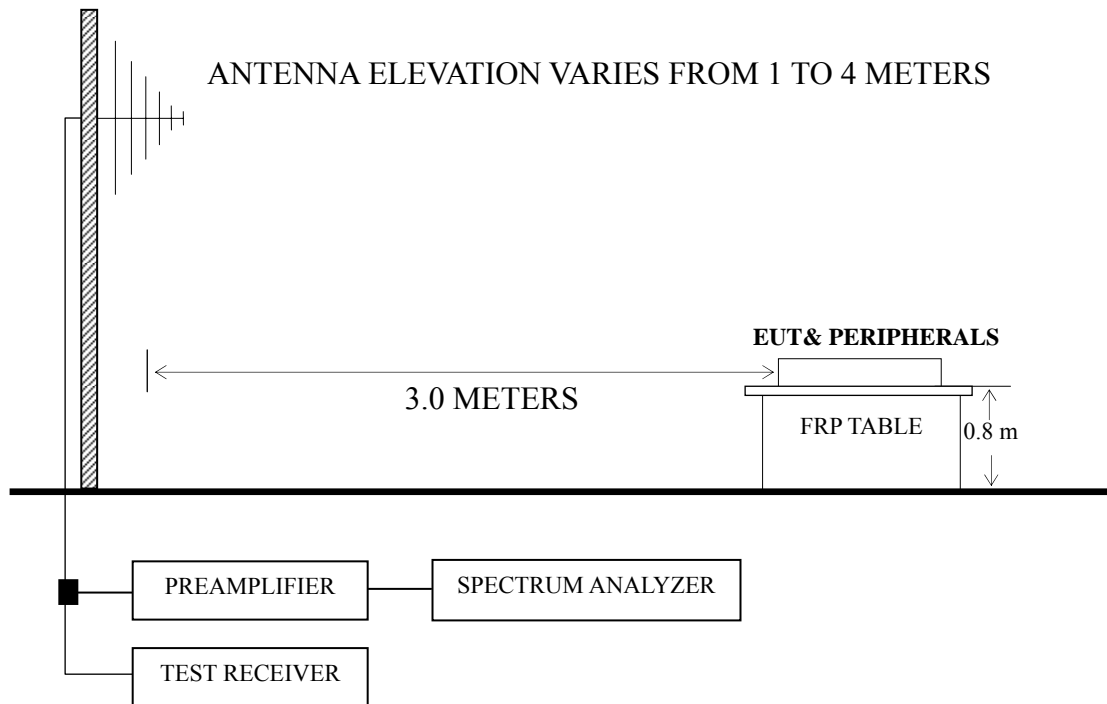
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Sep 03, 2013	Sep 02, 2014
2.	Preamplifier	Agilent	8447D	2944A10548	Sep 18, 2013	Mar 17, 2014
3.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2013	Mar 19, 2014
4.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 03, 2013	May 02, 2014
5.	Horn Antenna	EMCO	3115	9607-4878	May 11, 2013	May 10, 2014
6.	Spectrum	Agilent	E7405A	MY45106600	Nov 11, 2013	Nov 10, 2014
7.	50 Coaxial Switch	Anritsu	MP59B	6200426390	Sep 18, 2013	Mar 17, 2014
8.	Software	Audix	E3	6.2007-9-10	--	--

### 4.2 Block Diagram of Test Setup

#### 4.2.1 EUT & Peripherals



#### 4.2.2 Radiated emission test setup



■ : 50 ohm Coaxial Switch

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

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

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

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

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

NOTE 4 - The limits shown are based on Quasi-peak value detector.

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 24 GHz (10<sup>th</sup> harmonic of the 2.4GHz RF function) was checked for the worst emission 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 1920*1080@60Hz	P23 – P24
D-Sub 1920*1080@60Hz	P25
HDMI 1280*1024@60Hz	P26
HDMI 640*480@60Hz	P27
USB Play	P28
LAN Play	P29

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 400.540 MHz with corrected signal level of 43.71dB ( $\mu\text{V}/\text{m}$ ) (limit is 46.00 dB ( $\mu\text{V}/\text{m}$ )), when the antenna was 1.80 m height and the turntable was at 245°. The worst emission at vertical polarization was detected at 131.850 MHz with corrected signal level of 41.11dB ( $\mu\text{V}/\text{m}$ ) (limit is 43.50 dB ( $\mu\text{V}/\text{m}$ )), when the antenna was 1.80 m height and the turntable was at 165°.

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 60%RH

Test Mode : HDMI 1920\*1080@60Hz Date of Test : Feb 17, 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	70.740	30.56	5.89	0.94	--	37.39	40.00	2.61	QP
	136.700	27.77	10.74	1.58	--	40.09	43.50	3.41	
	<b>400.540</b>	<b>24.82</b>	<b>16.20</b>	<b>2.69</b>	--	<b>43.71</b>	<b>46.00</b>	<b>2.29</b>	
	592.600	21.74	18.60	3.20	--	43.54	46.00	2.46	
	704.150	19.73	20.13	3.55	--	43.41	46.00	2.59	
	742.950	20.74	18.87	3.57	--	43.18	46.00	2.82	
	1062.000	47.16	23.94	4.96	38.07	37.99	74.00	36.01	PK
	1201.000	47.48	24.53	5.10	37.74	39.37	74.00	34.63	
	1238.000	47.06	24.72	5.20	37.64	39.34	74.00	34.66	
	1373.000	45.90	25.25	5.55	37.28	39.42	74.00	34.58	
	1479.000	46.13	25.55	5.63	36.96	40.35	74.00	33.65	AV
	1641.000	47.80	27.14	5.81	36.60	44.15	74.00	29.85	
	1062.000	34.47	23.94	4.96	38.07	25.30	54.00	28.70	
	1201.000	34.33	24.53	5.10	37.74	26.22	54.00	27.78	
	1238.000	34.68	24.72	5.20	37.64	26.96	54.00	27.04	AV
	1373.000	32.11	25.25	5.55	37.28	25.63	54.00	28.37	
1479.000	33.78	25.55	5.63	36.96	28.00	54.00	26.00		
1641.000	34.90	27.14	5.81	36.60	31.25	54.00	22.75		

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 60%RH

Test Mode : HDMI 1920\*1080@60Hz Date of Test : Feb 17, 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	30.970	17.26	17.65	0.67	--	35.58	40.00	4.42	QP
	70.740	30.02	5.89	0.94	--	36.85	40.00	3.15	
	<b>131.850</b>	<b>28.02</b>	<b>11.54</b>	<b>1.55</b>	--	<b>41.11</b>	<b>43.50</b>	<b>2.39</b>	
	398.600	23.65	16.07	2.68	--	42.40	46.00	3.60	
	594.540	21.60	18.50	3.20	--	43.30	46.00	2.70	
	699.300	19.61	20.30	3.54	--	43.45	46.00	2.55	
	1045.000	46.82	23.87	4.94	38.10	37.53	74.00	36.47	PK
	1143.000	46.20	24.26	5.05	37.88	37.63	74.00	36.37	
	1220.000	45.86	24.63	5.15	37.69	37.95	74.00	36.05	
	1421.000	45.00	25.40	5.60	37.12	38.88	74.00	35.12	
	1476.000	45.04	25.55	5.63	36.97	39.25	74.00	34.75	
	1669.000	45.54	27.49	5.89	36.56	42.36	74.00	31.64	
	1045.000	33.73	23.87	4.94	38.10	24.44	54.00	29.56	AV
	1143.000	33.45	24.26	5.05	37.88	24.88	54.00	29.12	
	1220.000	32.17	24.63	5.15	37.69	24.26	54.00	29.74	
	1421.000	32.02	25.40	5.60	37.12	25.90	54.00	28.10	
	1476.000	32.12	25.55	5.63	36.97	26.33	54.00	27.67	
	1669.000	32.88	27.49	5.89	36.56	29.70	54.00	24.30	

TEST ENGINEER: NEAL WANG



EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 60%RH

Test Mode : D-Sub 1920\*1080@60Hz Date of Test : Feb 17, 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	<b>74.620</b>	<b>28.06</b>	<b>6.46</b>	<b>1.00</b>	<b>35.52</b>	<b>40.00</b>	<b>4.48</b>
	127.970	22.83	11.74	1.52	36.09	43.50	7.41
	396.660	19.81	15.93	2.68	38.42	46.00	7.58
	598.420	18.65	18.30	3.20	40.15	46.00	5.85
	711.910	14.92	19.68	3.55	38.15	46.00	7.85
	815.700	10.76	20.37	3.80	34.93	46.00	11.07
Vertical	34.850	16.63	15.85	0.71	33.19	40.00	6.81
	74.620	28.06	6.46	1.00	35.52	40.00	4.48
	128.940	26.56	11.82	1.53	39.91	43.50	3.59
	401.510	20.39	16.22	2.69	39.30	46.00	6.70
	<b>716.760</b>	<b>19.67</b>	<b>19.42</b>	<b>3.56</b>	<b>42.65</b>	<b>46.00</b>	<b>3.35</b>
	946.650	16.01	19.50	4.68	40.19	46.00	5.81

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 60%RH

Test Mode : HDMI 1280\*1024@60Hz Date of Test : Feb 17, 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	<b>70.740</b>	<b>29.31</b>	<b>5.89</b>	<b>0.94</b>	<b>36.14</b>	<b>40.00</b>	<b>3.86</b>
	131.850	26.19	11.54	1.55	39.28	43.50	4.22
	398.600	23.10	16.07	2.68	41.85	46.00	4.15
	592.600	18.57	18.60	3.20	40.37	46.00	5.63
	699.300	16.14	20.30	3.54	39.98	46.00	6.02
	810.850	15.47	20.20	3.70	39.37	46.00	6.63
Vertical	<b>70.740</b>	<b>28.17</b>	<b>5.89</b>	<b>0.94</b>	<b>35.00</b>	<b>40.00</b>	<b>5.00</b>
	134.760	24.68	11.00	1.57	37.25	43.50	6.25
	398.600	20.99	16.07	2.68	39.74	46.00	6.26
	594.540	19.26	18.50	3.20	40.96	46.00	5.04
	699.300	15.55	20.30	3.54	39.39	46.00	6.61
	891.360	16.92	19.63	4.43	40.98	46.00	5.02

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 60%RH

Test Mode : HDMI 640\*480@60Hz Date of Test : Feb 17, 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	<b>73.650</b>	<b>28.67</b>	<b>6.33</b>	<b>0.98</b>	<b>35.98</b>	<b>40.00</b>	<b>4.02</b>
	<b>136.700</b>	<b>27.16</b>	<b>10.74</b>	<b>1.58</b>	<b>39.48</b>	<b>43.50</b>	<b>4.02</b>
	151.250	25.79	9.98	1.65	37.42	43.50	6.08
	398.600	22.37	16.07	2.68	41.12	46.00	4.88
	447.100	20.43	17.07	2.82	40.32	46.00	5.68
	699.300	16.76	20.30	3.54	40.60	46.00	5.40
Vertical	71.710	28.17	6.02	0.95	35.14	40.00	4.86
	<b>133.790</b>	<b>26.31</b>	<b>11.22</b>	<b>1.56</b>	<b>39.09</b>	<b>43.50</b>	<b>4.41</b>
	151.250	26.98	9.98	1.65	38.61	43.50	4.89
	594.540	17.50	18.50	3.20	39.20	46.00	6.80
	699.300	15.37	20.30	3.54	39.21	46.00	6.79
	891.360	15.77	19.63	4.43	39.83	46.00	6.17

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 60%RH

Test Mode : USB Play Date of Test : Feb 17, 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	67.830	25.80	5.31	0.91	32.02	40.00	7.98
	<b>128.940</b>	<b>24.99</b>	<b>11.82</b>	<b>1.53</b>	<b>38.34</b>	<b>43.50</b>	<b>5.16</b>
	236.610	23.31	10.50	2.13	35.94	46.00	10.06
	303.540	20.35	12.80	2.56	35.71	46.00	10.29
	529.550	13.39	18.40	3.05	34.84	46.00	11.16
	669.230	14.44	19.45	3.44	37.33	46.00	8.67
Vertical	<b>36.790</b>	<b>17.09</b>	<b>14.92</b>	<b>0.74</b>	<b>32.75</b>	<b>40.00</b>	<b>7.25</b>
	78.500	23.70	6.71	1.05	31.46	40.00	8.54
	129.910	22.40	11.90	1.53	35.83	43.50	7.67
	525.670	13.95	18.35	3.03	35.33	46.00	10.67
	685.720	13.68	19.65	3.51	36.84	46.00	9.16
	809.880	13.77	20.20	3.70	37.67	46.00	8.33

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55K20DGW Humidity : 60%RH

Test Mode : LAN Play Date of Test : Feb 17, 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	79.470	24.06	6.76	1.06	31.88	40.00	8.12
	150.280	24.06	10.04	1.64	35.74	43.50	7.76
	228.850	23.95	9.50	2.09	35.54	46.00	10.46
	<b>339.430</b>	<b>20.97</b>	<b>14.80</b>	<b>2.61</b>	<b>38.38</b>	<b>46.00</b>	<b>7.62</b>
	478.140	15.11	17.90	2.92	35.93	46.00	10.07
	777.870	14.51	18.13	3.60	36.24	46.00	9.76
Vertical	<b>33.880</b>	<b>17.55</b>	<b>16.12</b>	<b>0.70</b>	<b>34.37</b>	<b>40.00</b>	<b>5.63</b>
	67.830	26.23	5.31	0.91	32.45	40.00	7.55
	126.030	23.63	11.60	1.51	36.74	43.50	6.76
	154.160	26.06	9.66	1.67	37.39	43.50	6.11
	404.420	18.43	16.23	2.69	37.35	46.00	8.65
	476.200	15.59	17.80	2.92	36.31	46.00	9.69

TEST ENGINEER: NEAL WANG

## 5 DEBUG DESCRIPTION

The following components are used during the countermeasure procedures:

Name	M/N	Manufacturer	Location
Gasket	35x0.7x41mm\VGA\ROH	Qingdao Joinset S&T Co., Ltd.	See Internal Photo Appendix Figure 19

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

TEST ENGINEER: Neal Wang  
(NEAL WANG)

## **6 DEVIATION TO TEST SPECIFICATIONS**

None.