

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

LED LCD TV

Model No.	Brand
55K680GW, 55K680UW	Hisense
55H8CG	

FCC ID : W9HLCDF0031

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

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Report No. : ACI-F14028
Date of Test : Jan 22 – Feb 07, 2014
Date of Report : Feb 17, 2014

TABLE OF CONTENTS

	Page
1 SUMMARY OF STANDARDS AND RESULTS	4
1.1 Description of Standards and Results.....	4
2 GENERAL INFORMATION	5
2.1 Description of Equipment Under Test.....	5
2.2 Peripherals.....	6
2.3 Description of Test Facility.....	8
2.4 Measurement Uncertainty.....	8
3 CONDUCTED EMISSION TEST	9
3.1 Test Equipment.....	9
3.2 Block Diagram of Test Setup.....	9
3.3 Conducted Emission Limit [FCC Part 15 Subpart B 15.107(a)].....	10
3.4 Test Configuration.....	10
3.5 Operating Condition of EUT.....	11
3.6 Test Procedures.....	11
3.7 Test Results.....	12
4 RADIATED EMISSION TEST	19
4.1 Test Equipment.....	19
4.2 Block Diagram of Test Setup.....	19
4.3 Radiated Emission Limit [FCC Part 15 Subpart B 15.109(a)].....	20
4.4 Test Configuration.....	20
4.5 Operating Condition of EUT.....	20
4.6 Test Procedures.....	21
4.7 Test Results.....	21
5 DEBUG DESCRIPTION	30
6 DEVIATION TO TEST SPECIFICATIONS	31

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
55K680GW, 55K680UW	Hisense	120V/60Hz
55H8CG		

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 Jan 22 – Feb 07, 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.F14029, a Verification report.

Date of Test : Jan 22 – Feb 07, 2014 Date of Report : Feb 17, 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
EMISSION			
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.	:	55K680GW, 55K680UW, 55H8CG
Note	:	The above models are all the same except for model name. 55H8CG 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 : HE550HUD-B31
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 #3
- (2) One HDMI3 Port : Connected with DVD PLAYER #1
- (3) One HDMI4/ARC Port : Connected with DVD PLAYER #2
- (4) One LAN Port : Connected with PC
- (5) One component of AV/YPbPr Port : Connected with DVD PLAYER #3

Side Port:

- (1) One IR Blaster Port : Connected with IR CABLE
- (2) One DIGITAL OUTPUT Port : Connected with DVD PLAYER #3
- (3) One PC/DVI AUDIO IN Port : Connected with PC
- (4) One VGA In Port : Connected with PC
- (5) One HDMI1 (UHD) Port : Connected with PC
- (6) One AUDIO OUT Port : Connected with Earphone
- (7) One ANT Port : Connected with ATSC SG / TV SG
- (8) Three USB Ports : Connected with U-Disk

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 : PHILIPS
Model Number : DVP3986K/93
Serial Number : KX1A0902120082
Certificate : FCC DoC, CE/EMC, CCC

2.2.10 DVD PLAYER #3

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

2.2.11 Earphone

Manufacturer : audio-technica
Model Number : ATH-CKL200

2.2.12 U-DISK*3

Manufacturer : LG
Model Number : 1GB

2.3 Description of Test Facility

Site Description (No.3 3m Chamber) : Sept. 17, 1998 file on
Mar 16, 2012 Renewed
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046, USA

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3F 34Bldg 680 Guiping Rd,
Caohejing Hi-Tech Park,
Shanghai 200233, China

NVLAP Lab Code : 200371-0

2.4 Measurement Uncertainty

Conducted Emission Expanded Uncertainty: U = 3.02 dB

Radiated Emission Expanded Uncertainty (30-200MHz):
U = 4.17 dB (Horizontal)
U = 4.02 dB (Vertical)

Radiated Emission Expanded Uncertainty (200M-1GHz):
U = 3.38 dB (Horizontal)
U = 3.28 dB (Vertical)

Radiated Emission Expanded Uncertainty (Above 1GHz):
U = 4.68 dB (Horizontal)
U = 4.87 dB (Vertical)

3 CONDUCTED EMISSION TEST

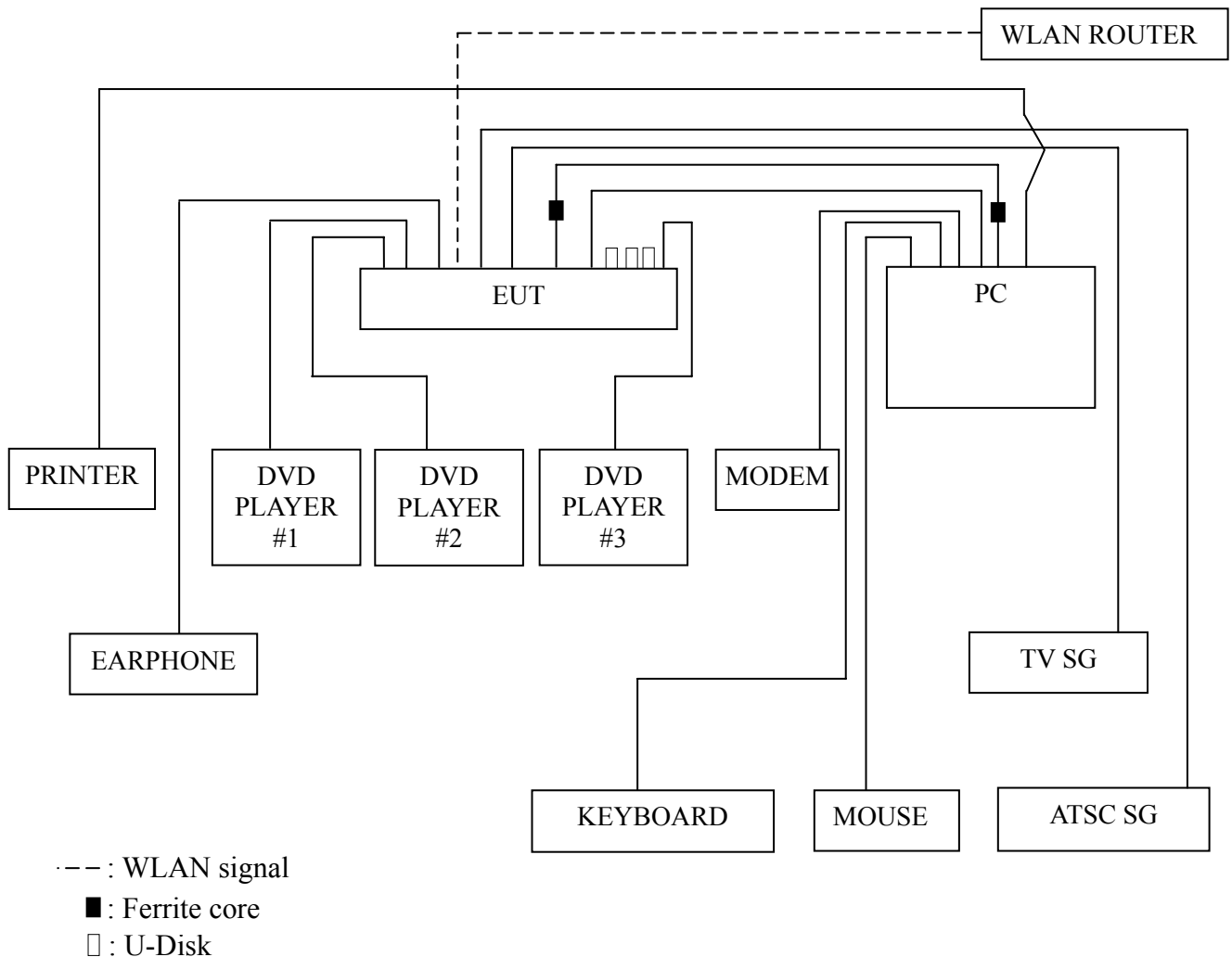
3.1 Test Equipment

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

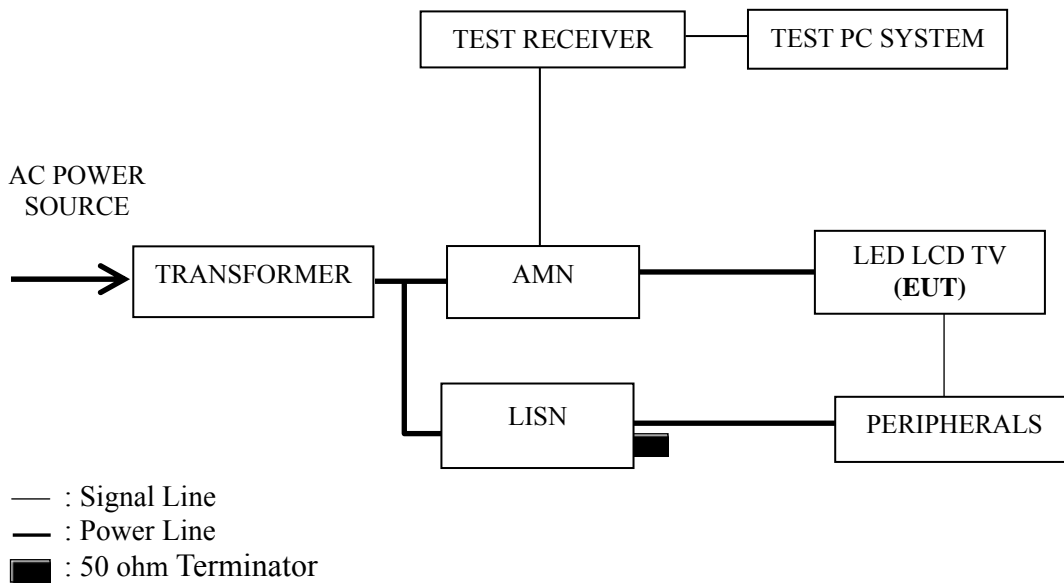
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Mar 20, 2013	Mar 19, 2014
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 25, 2013	Feb 24, 2014
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 20, 2013	Mar 19, 2014
4.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426389	Sep 18, 2013	Mar 17, 2014
5.	50 Ω Terminator	Anritsu	BNC	001	Mar 20, 2013	Mar 19, 2014
6.	Software	Audix	E3	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 (μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE 1 – The lower limit shall apply at the transition frequencies.
 NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz

3.4 Test Configuration

The EUT (listed in Sec.2.1) and the peripherals (listed in Sec 2.2) were installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner that tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

- 3.5.1 Setup the EUT and peripherals as shown in Sec. 3.2.
- 3.5.2 Turn on the power of all equipments and the EUT.
- 3.5.3 Set the contrast & brightness of EUT to maximum.
- 3.5.4 PC system ran the self-test program “EMC Test” by windows XP and sent “H” characters to EUT through graphic card, the EUT’s screen displayed and filled with “H” pattern by its resolution (Via D-Sub & HDMI Input).
- 3.5.5 In USB Play mode, set the EUT play digital media from U-Disk.
- 3.5.6 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 1280*1024@60Hz test mode. The worst emission is detected at 6.938 MHz (Average Value) with corrected signal level of 45.86 dB (μ V) (limit is 50.00 dB (μ V)), when the Line of the EUT is connected to AMN.

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 48%RH

Test Mode : D-Sub 1920*1080@60Hz Date of Test : Jan 22, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark	
Line	0.579	35.10	0.02	35.12	56.00	20.88	QP	
	0.793	36.40	0.09	36.49	56.00	19.51		
	1.280	34.50	0.05	34.55	56.00	21.45		
	3.232	34.60	0.13	34.73	56.00	21.27		
	6.922	47.80	0.26	48.06	60.00	11.94		
	21.470	39.90	-0.19	39.71	60.00	20.29		
	Line	0.579	25.80	0.02	25.82	46.00	20.18	AV
		0.793	25.00	0.09	25.09	46.00	20.91	
		1.280	23.60	0.05	23.65	46.00	22.35	
		3.232	26.70	0.13	26.83	46.00	19.17	
		6.922	43.20	0.26	43.46	50.00	6.54	
		21.470	33.00	-0.19	32.81	50.00	17.19	
Neutral	0.421	33.19	0.22	33.41	57.43	24.02	QP	
	0.790	36.20	0.14	36.34	56.00	19.66		
	1.284	33.90	0.17	34.07	56.00	21.93		
	2.212	34.20	0.17	34.37	56.00	21.63		
	6.928	45.99	0.33	46.32	60.00	13.68		
	21.950	40.00	0.84	40.84	60.00	19.16		
	Neutral	0.421	18.29	0.22	18.51	47.43	28.92	AV
		0.790	24.20	0.14	24.34	46.00	21.66	
		1.284	23.10	0.17	23.27	46.00	22.73	
		2.212	24.60	0.17	24.77	46.00	21.23	
		6.928	44.49	0.33	44.82	50.00	5.18	
		21.950	32.90	0.84	33.74	50.00	16.26	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 48%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Jan 22, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.429	33.49	-0.01	33.48	57.28	23.80	QP
	0.717	36.59	0.11	36.70	56.00	19.30	
	1.781	35.20	0.07	35.27	56.00	20.73	
	3.322	34.90	0.14	35.04	56.00	20.96	
	6.910	45.30	0.26	45.56	60.00	14.44	
	21.790	39.90	-0.22	39.68	60.00	20.32	
	0.429	23.59	-0.01	23.58	47.28	23.70	AV
	0.717	26.19	0.11	26.30	46.00	19.70	
	1.781	23.90	0.07	23.97	46.00	22.03	
	3.322	25.60	0.14	25.74	46.00	20.26	
	6.910	43.30	0.26	43.56	50.00	6.44	
	21.790	32.90	-0.22	32.68	50.00	17.32	
Neutral	0.287	33.30	0.22	33.52	60.61	27.09	QP
	0.715	36.42	0.12	36.54	56.00	19.46	
	1.274	34.50	0.17	34.67	56.00	21.33	
	3.245	34.91	0.18	35.09	56.00	20.91	
	6.941	46.50	0.33	46.83	60.00	13.17	
	21.750	40.00	0.84	40.84	60.00	19.16	
	0.287	23.90	0.22	24.12	50.61	26.49	AV
	0.715	26.20	0.12	26.32	46.00	19.68	
	1.274	23.60	0.17	23.77	46.00	22.23	
	3.245	26.71	0.18	26.89	46.00	19.11	
	6.941	43.90	0.33	44.23	50.00	5.77	
	21.750	33.10	0.84	33.94	50.00	16.06	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 48%RH

Test Mode : D-Sub 1280*1024@60Hz Date of Test : Jan 22, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.287	34.20	0.07	34.27	60.62	26.35	QP
	0.717	36.59	0.11	36.70	56.00	19.30	
	1.280	34.90	0.05	34.95	56.00	21.05	
	3.170	35.30	0.13	35.43	56.00	20.57	
	6.938	47.90	0.26	48.16	60.00	11.84	
	21.920	40.60	-0.22	40.38	60.00	19.62	
	0.287	24.80	0.07	24.87	50.62	25.75	AV
	0.717	26.29	0.11	26.40	46.00	19.60	
	1.280	24.00	0.05	24.05	46.00	21.95	
	3.170	27.20	0.13	27.33	46.00	18.67	
	6.938	45.60	0.26	45.86	50.00	4.14	
	21.920	33.30	-0.22	33.08	50.00	16.92	
Neutral	0.582	34.60	0.17	34.77	56.00	21.23	QP
	0.718	36.20	0.12	36.32	56.00	19.68	
	1.285	35.20	0.17	35.37	56.00	20.63	
	3.199	33.61	0.18	33.79	56.00	22.21	
	6.933	45.39	0.33	45.72	60.00	14.28	
	21.750	39.90	0.84	40.74	60.00	19.26	
	0.582	25.30	0.17	25.47	46.00	20.53	AV
	0.718	26.00	0.12	26.12	46.00	19.88	
	1.285	24.30	0.17	24.47	46.00	21.53	
	3.199	25.41	0.18	25.59	46.00	20.41	
	6.933	44.29	0.33	44.62	50.00	5.38	
	21.750	32.80	0.84	33.64	50.00	16.36	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 48%RH

Test Mode : D-Sub 640*480@60Hz Date of Test : Jan 22, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.718	36.59	0.11	36.70	56.00	19.30	QP
	1.267	35.10	0.05	35.15	56.00	20.85	
	2.712	35.30	0.10	35.40	56.00	20.60	
	4.253	34.20	0.18	34.38	56.00	21.62	
	6.923	46.90	0.26	47.16	60.00	12.84	
	21.920	40.80	-0.22	40.58	60.00	19.42	
	0.718	26.29	0.11	26.40	46.00	19.60	AV
	1.267	23.90	0.05	23.95	46.00	22.05	
	2.712	26.00	0.10	26.10	46.00	19.90	
	4.253	26.00	0.18	26.18	46.00	19.82	
	6.923	43.90	0.26	44.16	50.00	5.84	
	21.920	33.50	-0.22	33.28	50.00	16.72	
Neutral	0.579	34.80	0.17	34.97	56.00	21.03	QP
	0.792	36.50	0.14	36.64	56.00	19.36	
	1.363	34.20	0.17	34.37	56.00	21.63	
	3.213	36.51	0.18	36.69	56.00	19.31	
	6.818	45.80	0.32	46.12	60.00	13.88	
	21.980	40.49	0.85	41.34	60.00	18.66	
	0.579	26.10	0.17	26.27	46.00	19.73	AV
	0.792	24.80	0.14	24.94	46.00	21.06	
	1.363	22.00	0.17	22.17	46.00	23.83	
	3.213	27.01	0.18	27.19	46.00	18.81	
	6.818	44.30	0.32	44.62	50.00	5.38	
	21.980	32.89	0.85	33.74	50.00	16.26	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 48%RH

Test Mode : USB Play Date of Test : Jan 22, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.600	35.29	0.04	35.33	56.00	20.67	QP
	0.783	36.90	0.09	36.99	56.00	19.01	
	1.795	36.10	0.07	36.17	56.00	19.83	
	3.218	34.90	0.13	35.03	56.00	20.97	
	6.931	46.00	0.26	46.26	60.00	13.74	
	22.160	40.30	-0.25	40.05	60.00	19.95	
	0.600	24.49	0.04	24.53	46.00	21.47	AV
	0.783	25.20	0.09	25.29	46.00	20.71	
	1.795	24.50	0.07	24.57	46.00	21.43	
	3.218	26.00	0.13	26.13	46.00	19.87	
	6.931	43.50	0.26	43.76	50.00	6.24	
	22.160	33.00	-0.25	32.75	50.00	17.25	
Neutral	0.579	34.42	0.17	34.59	56.00	21.41	QP
	0.788	36.06	0.14	36.20	56.00	19.80	
	1.249	34.08	0.17	34.25	56.00	21.75	
	2.261	35.25	0.17	35.42	56.00	20.58	
	6.951	46.18	0.33	46.51	60.00	13.49	
	21.910	40.60	0.84	41.44	60.00	18.56	
	0.579	25.95	0.17	26.12	46.00	19.88	AV
	0.788	24.76	0.14	24.90	46.00	21.10	
	1.249	22.84	0.17	23.01	46.00	22.99	
	2.261	23.40	0.17	23.57	46.00	22.43	
	6.951	43.65	0.33	43.98	50.00	6.02	
	21.910	33.20	0.84	34.04	50.00	15.96	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 48%RH

Test Mode : LAN Play Date of Test : Jan 22, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.282	33.90	0.07	33.97	60.76	26.79	QP
	0.711	36.79	0.11	36.90	56.00	19.10	
	1.242	35.60	0.05	35.65	56.00	20.35	
	3.675	33.80	0.16	33.96	56.00	22.04	
	7.017	46.93	0.26	47.19	60.00	12.81	
	22.390	40.21	-0.28	39.93	60.00	20.07	
	0.282	24.80	0.07	24.87	50.76	25.89	AV
	0.711	25.69	0.11	25.80	46.00	20.20	
	1.242	24.50	0.05	24.55	46.00	21.45	
	3.675	26.30	0.16	26.46	46.00	19.54	
	7.017	44.30	0.26	44.56	50.00	5.44	
	22.390	32.81	-0.28	32.53	50.00	17.47	
Neutral	0.584	34.90	0.17	35.07	56.00	20.93	QP
	0.713	36.60	0.12	36.72	56.00	19.28	
	1.759	35.10	0.17	35.27	56.00	20.73	
	3.303	35.80	0.19	35.99	56.00	20.01	
	7.020	47.27	0.33	47.60	60.00	12.40	
	22.520	41.10	0.85	41.95	60.00	18.05	
	0.584	26.30	0.17	26.47	46.00	19.53	AV
	0.713	25.30	0.12	25.42	46.00	20.58	
	1.759	23.80	0.17	23.97	46.00	22.03	
	3.303	25.40	0.19	25.59	46.00	20.41	
	7.020	44.80	0.33	45.13	50.00	4.87	
	22.520	34.20	0.85	35.05	50.00	14.95	

TEST ENGINEER: ERIC TANG

4 RADIATED EMISSION TEST

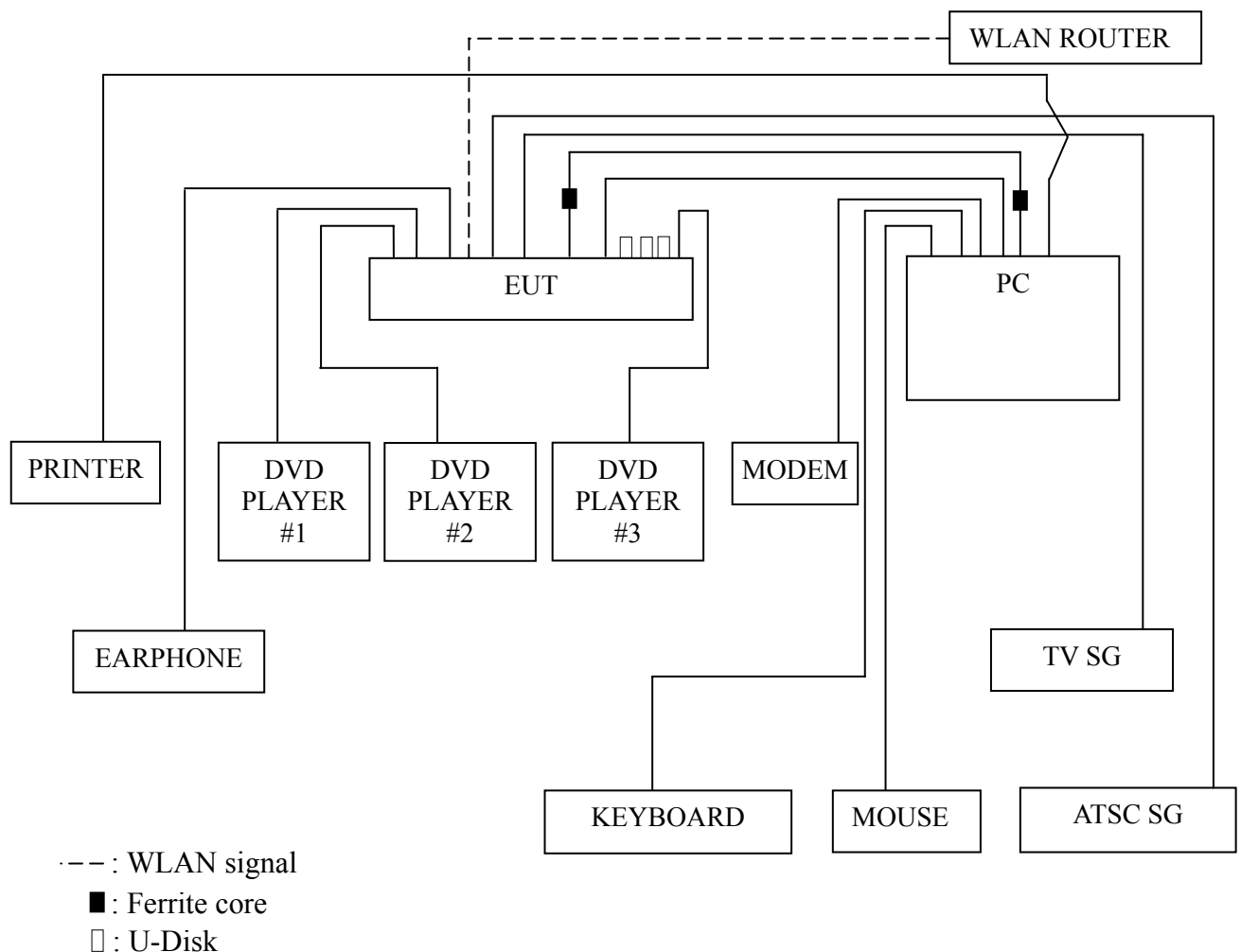
4.1 Test Equipment

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

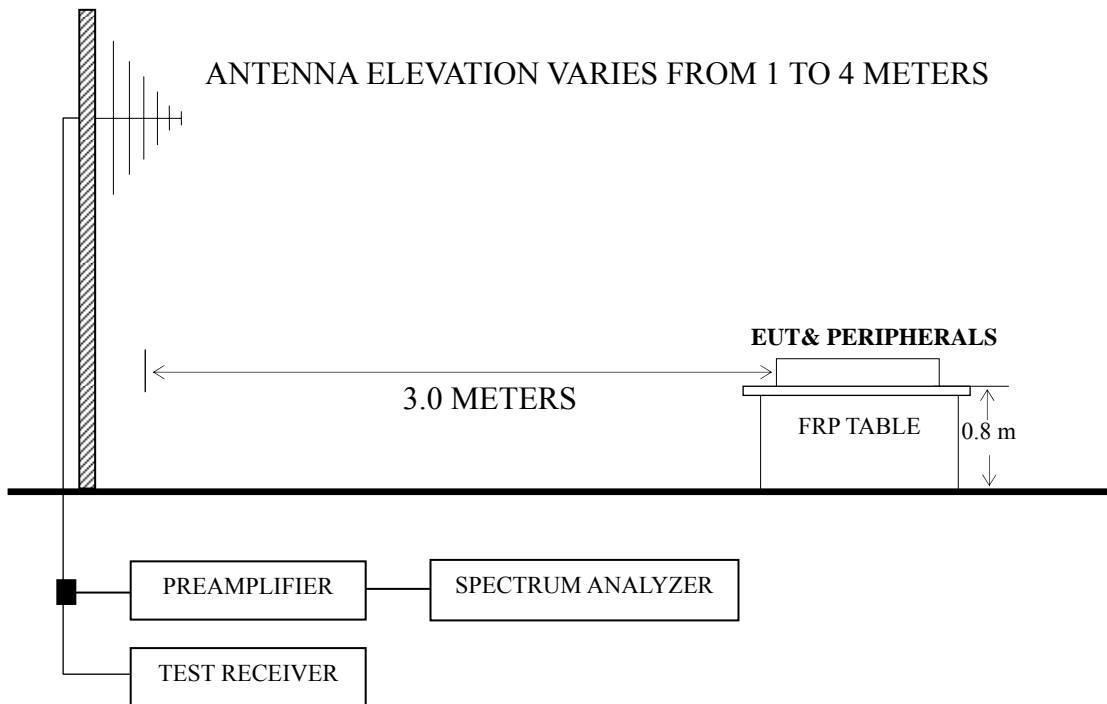
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Sep 03, 2013	Sep 02, 2014
2.	Preamplifier	Agilent	8447D	2944A10548	Sep 18, 2013	Mar 17, 2014
3.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2013	Mar 19, 2014
4.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 03, 2013	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 (10th 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 788.540 MHz with corrected signal level of 43.88 dB ($\mu\text{V}/\text{m}$) (limit is 46.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 2.00 m height and the turntable was at 210°. The worst emission at vertical polarization was detected at 794.360 MHz with corrected signal level of 44.07 dB ($\mu\text{V}/\text{m}$) (limit is 46.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.90 m height and the turntable was at 155°.

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Feb 07, 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
Horizontal	83.350	25.78	7.19	1.13	--	34.10	40.00	5.90	QP
	146.400	27.86	10.25	1.62	--	39.73	43.50	3.77	
	364.650	23.72	14.90	2.64	--	41.26	46.00	4.74	
	400.540	22.67	16.20	2.69	--	41.56	46.00	4.44	
	558.650	21.31	19.10	3.12	--	43.53	46.00	2.47	
	788.540	21.78	18.50	3.60	--	43.88	46.00	2.12	
	1112.000	47.77	24.14	5.01	37.95	38.97	74.00	35.03	PK
	1208.000	46.62	24.56	5.15	37.72	38.61	74.00	35.39	
	1400.000	46.44	25.33	5.59	37.19	40.17	74.00	33.83	
	1590.000	47.77	26.55	5.66	36.71	43.27	74.00	30.73	
	1788.000	46.36	28.99	6.15	36.37	45.13	74.00	28.87	
	1977.000	45.01	30.82	6.19	36.13	45.89	74.00	28.11	
	1112.000	34.65	24.14	5.01	37.95	25.85	54.00	28.15	AV
	1208.000	32.65	24.56	5.15	37.72	24.64	54.00	29.36	
	1400.000	33.64	25.33	5.59	37.19	27.37	54.00	26.63	
	1590.000	34.29	26.55	5.66	36.71	29.79	54.00	24.21	
	1788.000	33.79	28.99	6.15	36.37	32.56	54.00	21.44	
	1977.000	32.64	30.82	6.19	36.13	33.52	54.00	20.48	

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Jan 22, 2014

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
Vertical	30.970	18.22	17.65	0.67	--	36.54	40.00	3.46	QP
	146.400	28.86	10.25	1.62	--	40.73	43.50	2.77	
	374.350	24.84	14.95	2.66	--	42.45	46.00	3.55	
	558.650	21.17	19.10	3.12	--	43.39	46.00	2.61	
	794.360	21.39	19.07	3.61	--	44.07	46.00	1.93	
	924.340	19.78	19.50	4.59	--	43.87	46.00	2.13	
	1030.000	46.71	23.81	4.92	38.14	37.30	74.00	36.70	PK
	1078.000	46.59	24.00	4.98	38.03	37.54	74.00	36.46	
	1138.000	46.12	24.25	5.05	37.89	37.53	74.00	36.47	
	1396.000	45.67	25.32	5.59	37.21	39.37	74.00	34.63	
	1552.000	45.11	26.16	5.65	36.78	40.14	74.00	33.86	
	1747.000	44.82	28.50	6.06	36.43	42.95	74.00	31.05	
	AV	1030.000	33.29	23.81	4.92	38.14	23.88	54.00	30.12
		1078.000	34.33	24.00	4.98	38.03	25.28	54.00	28.72
		1138.000	32.11	24.25	5.05	37.89	23.52	54.00	30.48
		1396.000	31.94	25.32	5.59	37.21	25.64	54.00	28.36
1552.000		32.47	26.16	5.65	36.78	27.50	54.00	26.50	
1747.000		31.22	28.50	6.06	36.43	29.35	54.00	24.65	

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 60%RH

Test Mode : D-Sub 1920*1080@60Hz Date of Test : Jan 22, 2014

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	70.740	28.75	5.89	0.94	35.58	40.00	4.42
	93.050	25.86	8.94	1.26	36.06	43.50	7.44
	144.460	28.19	10.30	1.61	40.10	43.50	3.40
	400.540	21.82	16.20	2.69	40.71	46.00	5.29
	631.400	20.98	18.40	3.32	42.70	46.00	3.30
	716.760	19.91	19.42	3.56	42.89	46.00	3.11
Vertical	30.000	15.82	18.80	0.65	35.27	40.00	4.73
	47.460	26.24	8.30	0.84	35.38	40.00	4.62
	93.050	28.22	8.94	1.26	38.42	43.50	5.08
	148.340	28.66	10.15	1.63	40.44	43.50	3.06
	398.600	21.73	16.07	2.68	40.48	46.00	5.52
	791.450	20.65	18.70	3.61	42.96	46.00	3.04

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 60%RH

Test Mode : HDMI 1280*1024@60Hz Date of Test : Jan 22, 2014

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	70.740	27.89	5.89	0.94	34.72	40.00	5.28
	129.910	25.50	11.90	1.53	38.93	43.50	4.57
	187.140	30.53	8.10	1.87	40.50	43.50	3.00
	400.540	24.28	16.20	2.69	43.17	46.00	2.83
	558.650	20.68	19.10	3.12	42.90	46.00	3.10
	643.040	20.66	18.47	3.35	42.48	46.00	3.52
Vertical	70.740	28.50	5.89	0.94	35.33	40.00	4.67
	128.940	24.91	11.82	1.53	38.26	43.50	5.24
	144.460	27.38	10.30	1.61	39.29	43.50	4.21
	400.540	24.09	16.20	2.69	42.98	46.00	3.02
	718.700	19.69	19.42	3.56	42.67	46.00	3.33
	990.300	25.08	21.10	4.83	51.01	54.00	2.99

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 60%RH

Test Mode : HDMI 640*480@60Hz Date of Test : Jan 22, 2014

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	30.000	15.75	18.80	0.65	35.20	40.00	4.80
	63.950	27.80	4.70	0.90	33.40	40.00	6.60
	150.280	27.66	10.04	1.64	39.34	43.50	4.16
	369.500	22.51	14.80	2.65	39.96	46.00	6.04
	716.760	17.02	19.42	3.56	40.00	46.00	6.00
	791.450	19.62	18.70	3.61	41.93	46.00	4.07
Vertical	30.970	17.23	17.65	0.67	35.55	40.00	4.45
	66.860	27.87	5.12	0.91	33.90	40.00	6.10
	150.280	28.71	10.04	1.64	40.39	43.50	3.11
	408.300	23.21	16.28	2.71	42.20	46.00	3.80
	542.160	20.30	19.48	3.08	42.86	46.00	3.14
	794.360	19.44	19.07	3.61	42.12	46.00	3.88

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 60%RH

Test Mode : USB Play Date of Test : Jan 22, 2014

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	34.850	14.76	15.85	0.71	31.32	40.00	8.68
	73.650	25.91	6.33	0.98	33.22	40.00	6.78
	144.460	26.49	10.30	1.61	38.40	43.50	5.10
	364.650	22.40	14.90	2.64	39.94	46.00	6.06
	398.600	22.16	16.07	2.68	40.91	46.00	5.09
	788.540	16.97	18.50	3.60	39.07	46.00	6.93
Vertical	76.560	26.66	6.59	1.03	34.28	40.00	5.72
	150.280	24.59	10.04	1.64	36.27	43.50	7.23
	187.140	26.44	8.10	1.87	36.41	43.50	7.09
	393.750	22.30	15.67	2.68	40.65	46.00	5.35
	555.740	18.38	19.20	3.10	40.68	46.00	5.32
	697.360	16.26	20.30	3.54	40.10	46.00	5.90

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22

Model No. : 55H8CG Humidity : 60%RH

Test Mode : LAN Play Date of Test : Jan 22, 2014

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	30.970	15.95	17.65	0.67	34.27	40.00	5.73
	63.950	27.49	4.70	0.90	33.09	40.00	6.91
	146.400	26.19	10.25	1.62	38.06	43.50	5.44
	374.350	23.45	14.95	2.66	41.06	46.00	4.94
	555.740	16.91	19.20	3.10	39.21	46.00	6.79
	794.360	16.89	19.07	3.61	39.57	46.00	6.43
Vertical	30.970	16.25	17.65	0.67	34.57	40.00	5.43
	80.440	23.62	6.84	1.08	31.54	40.00	8.46
	154.160	27.42	9.66	1.67	38.75	43.50	4.75
	400.540	20.53	16.20	2.69	39.42	46.00	6.58
	555.740	19.31	19.20	3.10	41.61	46.00	4.39
	794.360	19.19	19.07	3.61	41.87	46.00	4.13

TEST ENGINEER: NEAL WANG

5 DEBUG DESCRIPTION

The following components are used during the countermeasure procedures:

Name	M/N	Manufacturer	Location
Ferrite core	ZCAT2132-1130\ROH	Jiangsu Ruifeng Electronic Co., Ltd.	See Internal Photo Appendix Figure 24
		FEELUX	
		Jiangsu Chenlang Group Electronic Co., Ltd.	

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.