

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

LED LCD TV

Model No.	Brand
40K20DW, 40K21DW, 40K22DW, 40K23DW, 40K24DW, 40K25DW	Hisense
40H5, 40H5C, 40H5E, 40H5S, 40H5I	

FCC ID : W9HLCDD0039

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Development Zone, Qingdao, China

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Report No. : ACI-F14004
Date of Test : Dec 26 – 29, 2013
Date of Report : Jan 09, 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
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 Dec 26 – 29, 2013 is technically compliance with the FCC official limits also.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report contains data that are not covered by the NVLAP accreditation.


This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.


The test results for EUT's TV functions are contained in No.F14005, a Verification report.

Date of Test : Dec 26 – 29, 2013 Date of Report : Jan 09, 2014

Producer : 
 KATHY WANG / Supervisor

Review : 
 DIAO YANG / Assistant Manager

 For and on behalf of
 Audix Technology (Shanghai) Co., Ltd.

Signatory : 
 Authorized Signature EMC SAMMY CHEN / Deputy Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description of Test Item	Standard	Limits	Results
EMISSION			
Conducted Disturbance at the Mains Terminal	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 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 type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-product <input type="checkbox"/> Pro-type
Model No.	:	40K20DW, 40K21DW, 40K22DW, 40K23DW, 40K24DW, 40K25DW, 40H5, 40H5C, 40H5E, 40H5S, 40H5I
Note	:	The above models are all the same except for model name. 40H5 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 : HD400DF-E37(010)\S0.B2
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 : PHILIPS
Model Number : DVP3986K/93
Serial Number : KX1A0902120082
Certificate : FCC DoC, CE/EMC, CCC

2.2.10 Earphone

Manufacturer : audio-technica
Model Number : ATH-CKL200

2.2.11 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

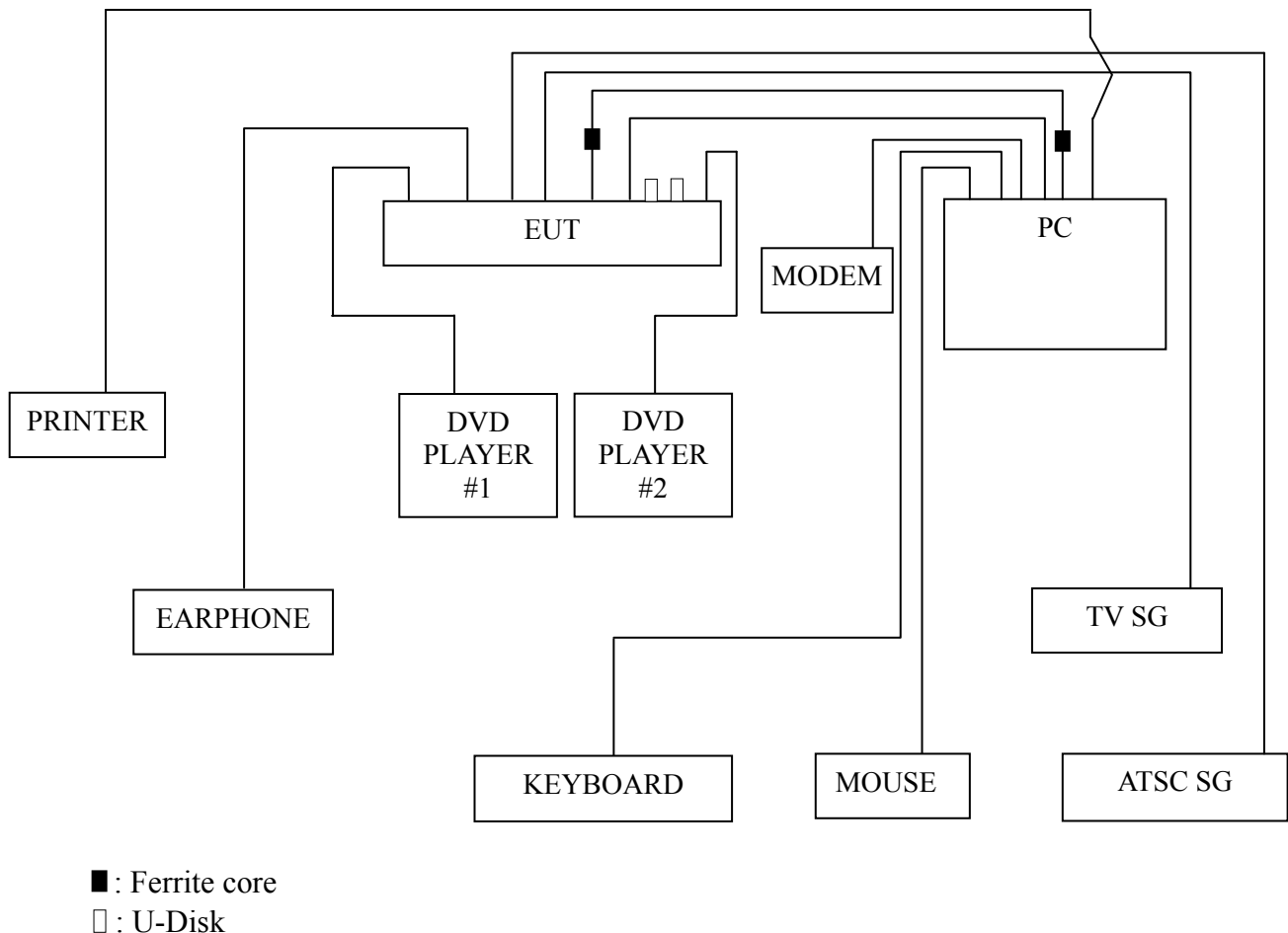
3.1 Test Equipment

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

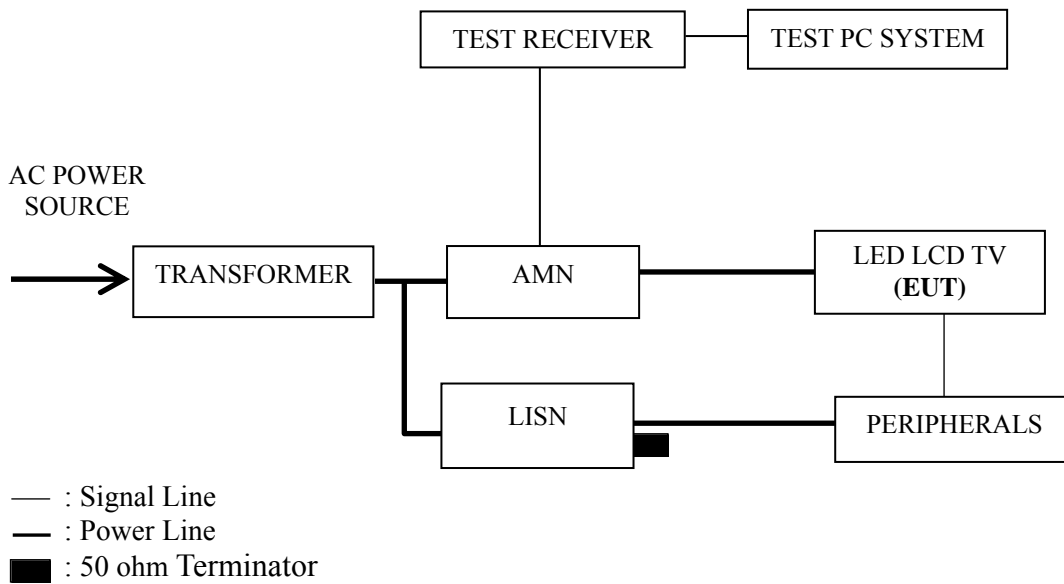
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Mar 20, 2013	Mar 19, 2014
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 25, 2013	Feb 24, 2014
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 20, 2013	Mar 19, 2014
4.	50 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 other peripherals devices were driven and operated during the test.

3.5.8 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 5.665 MHz (Average Value) with corrected signal level of 44.12 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°C
 Model No. : 40H5 Humidity : 48%RH
 Test Mode : D-Sub 1920*1080@60Hz Date of Test : Dec 26, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.170	37.40	0.14	37.54	64.97	27.43	QP
	0.458	40.70	-0.03	40.67	56.73	16.06	
	0.567	45.40	0.01	45.41	56.00	10.59	
	2.583	39.91	0.09	40.00	56.00	16.00	
	5.665	48.00	0.22	48.22	60.00	11.78	
	22.090	46.49	-0.23	46.26	60.00	13.74	
	0.170	16.60	0.14	16.74	54.97	38.23	AV
	0.458	28.10	-0.03	28.07	46.73	18.66	
	0.567	30.60	0.01	30.61	46.00	15.39	
	2.583	27.21	0.09	27.30	46.00	18.70	
	5.665	43.90	0.22	44.12	50.00	5.88	
	22.090	36.79	-0.23	36.56	50.00	13.44	
Neutral	0.162	35.50	0.16	35.66	65.35	29.69	QP
	0.417	38.09	0.22	38.31	57.51	19.20	
	0.567	43.69	0.18	43.87	56.00	12.13	
	2.796	38.60	0.17	38.77	56.00	17.23	
	5.662	47.30	0.26	47.56	60.00	12.44	
	21.840	41.10	0.84	41.94	60.00	18.06	
	0.162	16.80	0.16	16.96	55.35	38.39	AV
	0.417	25.79	0.22	26.01	47.51	21.50	
	0.567	29.29	0.18	29.47	46.00	16.53	
	2.796	27.00	0.17	27.17	46.00	18.83	
	5.662	43.50	0.26	43.76	50.00	6.24	
	21.840	35.20	0.84	36.04	50.00	13.96	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22°C
 Model No. : 40H5 Humidity : 48%RH
 Test Mode : HDMI 1920*1080@60Hz Date of Test : Dec 26, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark	
Line	0.166	37.80	0.14	37.94	65.14	27.20	QP	
	0.568	45.14	0.01	45.15	56.00	10.85		
	1.943	38.60	0.08	38.68	56.00	17.32		
	5.663	47.60	0.22	47.82	60.00	12.18		
	12.820	40.90	0.07	40.97	60.00	19.03		
	21.600	45.59	-0.20	45.39	60.00	14.61		
	0.166	17.80	0.14	17.94	55.14	37.20	AV	
	0.568	30.80	0.01	30.81	46.00	15.19		
	1.943	27.60	0.08	27.68	46.00	18.32		
	5.663	42.50	0.22	42.72	50.00	7.28		
	12.820	35.00	0.07	35.07	50.00	14.93		
	21.600	39.49	-0.20	39.29	50.00	10.71		
	Neutral	0.171	38.10	0.17	38.27	64.92	26.65	QP
		0.568	44.49	0.18	44.67	56.00	11.33	
1.258		37.30	0.17	37.47	56.00	18.53		
2.945		35.90	0.18	36.08	56.00	19.92		
5.663		46.80	0.26	47.06	60.00	12.94		
21.900		41.70	0.84	42.54	60.00	17.46		
0.171		16.50	0.17	16.67	54.92	38.25	AV	
0.568		30.09	0.18	30.27	46.00	15.73		
1.258		32.80	0.17	32.97	46.00	13.03		
2.945		26.10	0.18	26.28	46.00	19.72		
5.663		42.40	0.26	42.66	50.00	7.34		
21.900		35.00	0.84	35.84	50.00	14.16		

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22°C
 Model No. : 40H5 Humidity : 48%RH
 Test Mode : D-Sub 1280*1024@60Hz Date of Test : Dec 26, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.150	34.50	0.16	34.66	65.99	31.33	QP
	0.457	41.60	-0.03	41.57	56.75	15.18	
	0.567	45.80	0.01	45.81	56.00	10.19	
	2.938	40.20	0.12	40.32	56.00	15.68	
	5.808	46.20	0.23	46.43	60.00	13.57	
	12.700	40.60	0.07	40.67	60.00	19.33	
	0.150	19.50	0.16	19.66	55.99	36.33	AV
	0.457	28.10	-0.03	28.07	46.75	18.68	
	0.567	31.20	0.01	31.21	46.00	14.79	
	2.938	29.10	0.12	29.22	46.00	16.78	
	5.808	38.00	0.23	38.23	50.00	11.77	
	12.700	33.80	0.07	33.87	50.00	16.13	
Neutral	0.170	37.60	0.17	37.77	64.95	27.18	QP
	0.423	39.49	0.22	39.71	57.39	17.68	
	0.566	44.59	0.18	44.77	56.00	11.23	
	2.285	36.10	0.17	36.27	56.00	19.73	
	5.666	46.80	0.26	47.06	60.00	12.94	
	21.770	41.50	0.84	42.34	60.00	17.66	
	0.170	16.60	0.17	16.77	54.95	38.18	AV
	0.423	26.69	0.22	26.91	47.39	20.48	
	0.566	29.79	0.18	29.97	46.00	16.03	
	2.285	26.90	0.17	27.07	46.00	18.93	
	5.666	42.10	0.26	42.36	50.00	7.64	
	21.770	35.80	0.84	36.64	50.00	13.36	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22°C
 Model No. : 40H5 Humidity : 48%RH
 Test Mode : D-Sub 640*480@60Hz Date of Test : Dec 26, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.566	45.80	0.01	45.81	56.00	10.19	QP
	1.262	39.00	0.05	39.05	56.00	16.95	
	2.795	40.81	0.10	40.91	56.00	15.09	
	5.663	47.17	0.22	47.39	60.00	12.61	
	12.910	41.51	0.06	41.57	60.00	18.43	
	21.940	45.90	-0.22	45.68	60.00	14.32	
	AV	0.566	32.20	0.01	32.21	46.00	13.79
		1.262	31.90	0.05	31.95	46.00	14.05
		2.795	29.61	0.10	29.71	46.00	16.29
		5.663	42.50	0.22	42.72	50.00	7.28
		12.910	34.81	0.06	34.87	50.00	15.13
		21.940	39.30	-0.22	39.08	50.00	10.92
Neutral	0.165	37.21	0.16	37.37	65.20	27.83	QP
	0.567	44.99	0.18	45.17	56.00	10.83	
	1.262	37.10	0.17	37.27	56.00	18.73	
	2.518	38.60	0.16	38.76	56.00	17.24	
	5.665	47.60	0.26	47.86	60.00	12.14	
	22.040	41.79	0.85	42.64	60.00	17.36	
	AV	0.165	17.91	0.16	18.07	55.20	37.13
		0.567	30.49	0.18	30.67	46.00	15.33
		1.262	31.40	0.17	31.57	46.00	14.43
		2.518	29.60	0.16	29.76	46.00	16.24
		5.665	42.30	0.26	42.56	50.00	7.44
		22.040	35.99	0.85	36.84	50.00	13.16

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 40H5 Humidity : 48%RH

Test Mode : USB Play Date of Test : Dec 26, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.171	37.71	0.13	37.84	64.93	27.09	QP
	0.568	46.00	0.01	46.01	56.00	9.99	
	1.257	38.60	0.05	38.65	56.00	17.35	
	2.933	38.30	0.12	38.42	56.00	17.58	
	5.664	47.50	0.22	47.72	60.00	12.28	
	21.740	45.09	-0.20	44.89	60.00	15.11	
	0.171	16.61	0.13	16.74	54.93	38.19	AV
	0.568	31.30	0.01	31.31	46.00	14.69	
	1.257	32.70	0.05	32.75	46.00	13.25	
	2.933	29.10	0.12	29.22	46.00	16.78	
	5.664	42.80	0.22	43.02	50.00	6.98	
	21.740	39.19	-0.20	38.99	50.00	11.01	
Neutral	0.166	37.31	0.16	37.47	65.16	27.69	QP
	0.569	44.89	0.18	45.07	56.00	10.93	
	1.262	36.30	0.17	36.47	56.00	19.53	
	2.287	36.30	0.17	36.47	56.00	19.53	
	5.665	45.50	0.26	45.76	60.00	14.24	
	21.970	41.49	0.85	42.34	60.00	17.66	
	0.166	17.81	0.16	17.97	55.16	37.19	AV
	0.569	30.29	0.18	30.47	46.00	15.53	
	1.262	30.30	0.17	30.47	46.00	15.53	
	2.287	27.20	0.17	27.37	46.00	18.63	
	5.665	42.00	0.26	42.26	50.00	7.74	
	21.970	33.79	0.85	34.64	50.00	15.36	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 40H5 Humidity : 48%RH

Test Mode : LAN Play Date of Test : Dec 26, 2013

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.161	37.28	0.14	37.42	65.43	28.01	QP
	0.567	45.71	0.01	45.72	56.00	10.28	
	1.210	39.93	0.05	39.98	56.00	16.02	
	2.931	39.62	0.12	39.74	56.00	16.26	
	5.653	47.28	0.22	47.50	60.00	12.50	
	21.830	45.33	-0.22	45.11	60.00	14.89	
	0.161	18.73	0.14	18.87	55.43	36.56	AV
	0.567	31.53	0.01	31.54	46.00	14.46	
	1.210	26.10	0.05	26.15	46.00	19.85	
	2.931	27.60	0.12	27.72	46.00	18.28	
	5.653	42.64	0.22	42.86	50.00	7.14	
	21.830	39.10	-0.22	38.88	50.00	11.12	
Neutral	0.169	38.35	0.17	38.52	64.99	26.47	QP
	0.567	45.37	0.18	45.55	56.00	10.45	
	1.262	37.72	0.17	37.89	56.00	18.11	
	2.285	36.95	0.17	37.12	56.00	18.88	
	5.653	47.19	0.26	47.45	60.00	12.55	
	21.600	41.29	0.84	42.13	60.00	17.87	
	0.169	16.81	0.17	16.98	54.99	38.01	AV
	0.567	30.64	0.18	30.82	46.00	15.18	
	1.262	24.40	0.17	24.57	46.00	21.43	
	2.285	26.31	0.17	26.48	46.00	19.52	
	5.653	42.58	0.26	42.84	50.00	7.16	
	21.600	35.90	0.84	36.74	50.00	13.26	

TEST ENGINEER: ERIC TANG

4 RADIATED EMISSION TEST

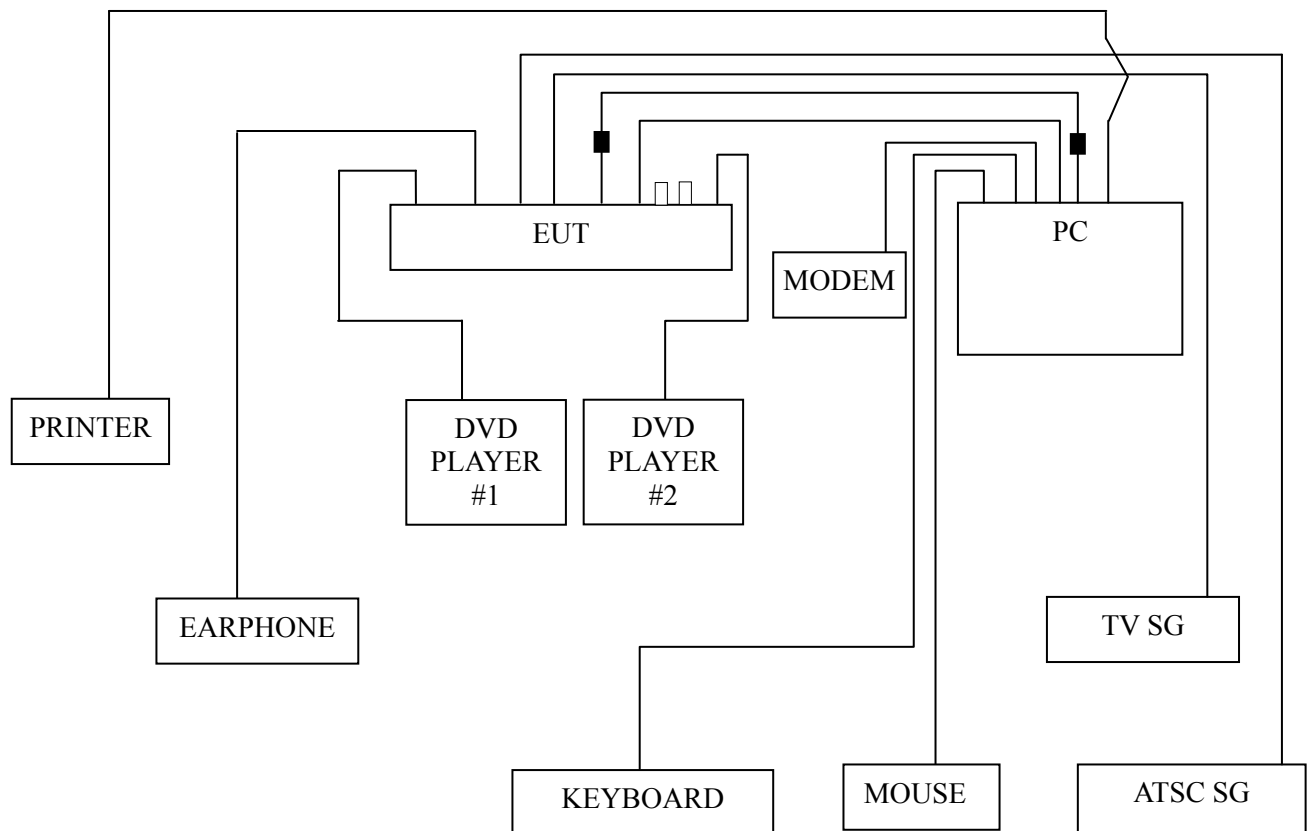
4.1 Test Equipment

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.	50Ω 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

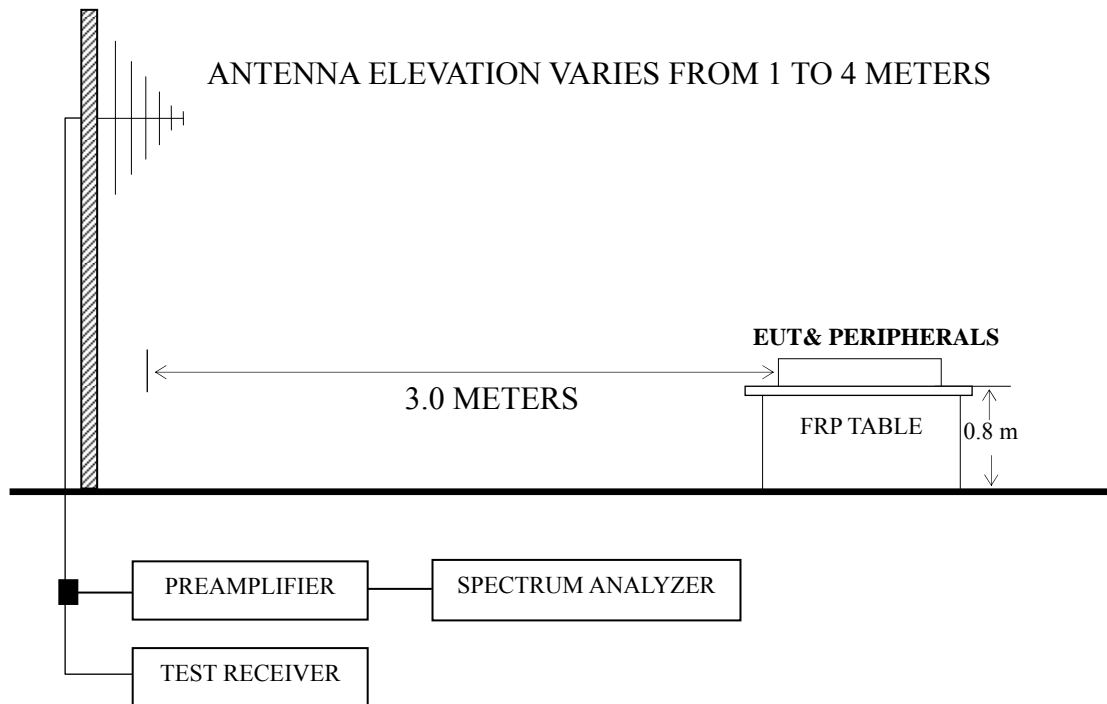
4.2.1 EUT & Peripherals



■ : Ferrite core

□ : U-Disk

4.2.2 Radiated emission test setup



■ : 50 ohm Coaxial Switch

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

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

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

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

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

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

NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT.

4.4 Test Configuration

The configuration of the EUT and peripherals are same as those used in conducted emission test.

Please refer to Sec.3.4.

4.5 Operating Condition of EUT

Same as conducted emission test which is listed in Sec.3.5, except for the test setup replaced by Sec.4.2.

4.6 Test Procedures

The EUT and peripherals were placed on a FRP turntable that is 0.8 meter above ground. The FRP turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. Broadband antenna (Calibrated Bilog Antenna) was used as receiving antenna. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.4:2003 requirements during radiated emission test.

The I.F. bandwidth of Test Receiver R&S ESCI was set at 120 kHz.

The frequency range from 30 MHz to 1000MHz was checked for all test modes.

The frequency range from 1 GHz to 2 GHz was checked for the 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 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 591.630 MHz with corrected signal level of 44.59 dB ($\mu\text{V}/\text{m}$) (limit is 46.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.70 m height and the turntable was at 68°. The worst emission at vertical polarization was detected at 667.290 MHz with corrected signal level of 44.36 dB ($\mu\text{V}/\text{m}$) (limit is 46.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.60 m height and the turntable was at 235°.

EUT : LED LCD TV Temperature : 22°C

Model No. : 40H5 Humidity : 60%RH

Test Mode : D-Sub 1920*1080@60Hz Date of Test : Dec 29, 2013

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)
Horizontal	129.910	23.46	11.90	1.53	36.89	43.50	6.61
	148.340	27.90	10.15	1.63	39.68	43.50	3.82
	295.780	27.52	12.58	2.52	42.62	46.00	3.38
	589.690	18.49	18.70	3.18	40.37	46.00	5.63
	701.240	18.69	20.30	3.54	42.53	46.00	3.47
	958.290	17.65	20.10	4.72	42.47	46.00	3.53
Vertical	46.490	21.81	8.80	0.83	31.44	40.00	8.56
	92.080	22.83	8.66	1.24	32.73	43.50	10.77
	196.840	29.44	8.20	1.94	39.58	43.50	3.92
	295.780	26.50	12.58	2.52	41.60	46.00	4.40
	589.690	18.63	18.70	3.18	40.51	46.00	5.49
	672.140	18.17	19.60	3.44	41.21	46.00	4.79

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C
 Model No. : 40H5 Humidity : 60%RH
 Test Mode : HDMI 1920*1080@60Hz Date of Test : Dec 29, 2013

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	148.340	27.76	10.15	1.63	--	39.54	43.50	3.96	QP
	223.030	26.50	8.43	2.06	--	36.99	46.00	9.01	
	322.940	22.76	14.02	2.58	--	39.36	46.00	6.64	
	478.140	20.24	17.90	2.92	--	41.06	46.00	4.94	
	591.630	22.79	18.60	3.20	--	44.59	46.00	1.41	
	698.330	20.68	20.30	3.54	--	44.52	46.00	1.48	
	1128.000	47.25	24.21	5.03	37.91	38.58	74.00	35.42	PK
	1209.000	46.82	24.58	5.15	37.72	38.83	74.00	35.17	
	1267.000	48.26	24.85	5.30	37.56	40.85	74.00	33.15	
	1500.000	46.47	25.60	5.64	36.91	40.80	74.00	33.20	
	1739.000	49.38	28.37	6.06	36.44	47.37	74.00	26.63	
	1935.000	46.90	30.44	6.18	36.17	47.35	74.00	26.65	
	1128.000	34.34	24.21	5.03	37.91	25.67	54.00	28.33	AV
	1209.000	33.22	24.58	5.15	37.72	25.23	54.00	28.77	
	1267.000	35.73	24.85	5.30	37.56	28.32	54.00	25.68	
1500.000	33.20	25.60	5.64	36.91	27.53	54.00	26.47		
1739.000	36.41	28.37	6.06	36.44	34.40	54.00	19.60		
1935.000	33.15	30.44	6.18	36.17	33.60	54.00	20.40		

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 40H5 Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Dec 29, 2013

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Vertical	46.490	22.90	8.80	0.83	--	32.53	40.00	7.47	QP
	92.080	24.13	8.66	1.24	--	34.03	43.50	9.47	
	145.430	26.66	10.28	1.62	--	38.56	43.50	4.94	
	295.780	27.73	12.58	2.52	--	42.83	46.00	3.17	
	591.630	20.88	18.60	3.20	--	42.68	46.00	3.32	
	667.290	21.47	19.45	3.44	--	44.36	46.00	1.64	PK
	1051.000	46.70	23.89	4.94	38.09	37.44	74.00	36.56	
	1212.000	45.60	24.60	5.15	37.71	37.64	74.00	36.36	
	1429.000	46.32	25.42	5.60	37.09	40.25	74.00	33.75	
	1575.000	45.47	26.40	5.66	36.74	40.79	74.00	33.21	
	1740.000	45.41	28.43	6.06	36.44	43.46	74.00	30.54	AV
	1951.000	44.87	30.59	6.19	36.16	45.49	74.00	28.51	
	1051.000	33.45	23.89	4.94	38.09	24.19	54.00	29.81	
	1212.000	32.80	24.60	5.15	37.71	24.84	54.00	29.16	
	1429.000	33.44	25.42	5.60	37.09	27.37	54.00	26.63	
1575.000	32.61	26.40	5.66	36.74	27.93	54.00	26.07	AV	
1740.000	32.91	28.43	6.06	36.44	30.96	54.00	23.04		
1951.000	31.03	30.59	6.19	36.16	31.65	54.00	22.35		

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 40H5 Humidity : 60%RH

Test Mode : HDMI 1280*1024@60Hz Date of Test : Dec 29, 2013

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)
Horizontal	124.090	25.46	11.48	1.50	38.44	43.50	5.06
	150.280	28.02	10.04	1.64	39.70	43.50	3.80
	164.830	28.98	8.40	1.75	39.13	43.50	4.37
	286.080	24.48	12.37	2.46	39.31	46.00	6.69
	444.190	21.90	17.15	2.82	41.87	46.00	4.13
	591.630	20.74	18.60	3.20	42.54	46.00	3.46
Vertical	36.790	16.74	14.92	0.74	32.40	40.00	7.60
	145.430	26.61	10.28	1.62	38.51	43.50	4.99
	201.690	30.14	8.07	1.95	40.16	43.50	3.34
	444.190	19.76	17.15	2.82	39.73	46.00	6.27
	591.630	19.91	18.60	3.20	41.71	46.00	4.29
	963.140	18.26	20.33	4.72	43.31	54.00	10.69

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 40H5 Humidity : 60%RH

Test Mode : HDMI 640*480@60Hz Date of Test : Dec 29, 2013

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)
Horizontal	87.230	21.91	7.74	1.18	30.83	40.00	9.17
	145.430	27.12	10.28	1.62	39.02	43.50	4.48
	177.440	29.25	8.26	1.83	39.34	43.50	4.16
	261.830	24.16	12.90	2.27	39.33	46.00	6.67
	298.690	26.18	12.52	2.52	41.22	46.00	4.78
	698.330	17.61	20.30	3.54	41.45	46.00	4.55
Vertical	198.780	27.04	8.20	1.94	37.18	43.50	6.32
	218.180	28.58	7.95	2.04	38.57	46.00	7.43
	298.690	26.60	12.52	2.52	41.64	46.00	4.36
	594.540	20.25	18.50	3.20	41.95	46.00	4.05
	698.330	17.59	20.30	3.54	41.43	46.00	4.57
	926.280	17.58	19.30	4.63	41.51	46.00	4.49

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 40H5 Humidity : 60%RH

Test Mode : USB Play Date of Test : Dec 29, 2013

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)
Horizontal	126.030	23.84	11.60	1.51	36.95	43.50	6.55
	150.280	27.95	10.04	1.64	39.63	43.50	3.87
	223.030	27.69	8.43	2.06	38.18	46.00	7.82
	347.190	20.66	14.80	2.62	38.08	46.00	7.92
	479.110	20.38	18.00	2.92	41.30	46.00	4.70
	698.330	16.87	20.30	3.54	40.71	46.00	5.29
Vertical	48.430	26.89	7.98	0.84	35.71	40.00	4.29
	94.990	25.05	9.30	1.29	35.64	43.50	7.86
	216.240	28.05	7.72	2.03	37.80	46.00	8.20
	324.880	18.33	14.09	2.58	35.00	46.00	11.00
	667.290	17.84	19.45	3.44	40.73	46.00	5.27
	814.730	17.81	20.37	3.80	41.98	46.00	4.02

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 40H5 Humidity : 60%RH

Test Mode : LAN Play Date of Test : Dec 29, 2013

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)
Horizontal	138.640	26.13	10.51	1.59	38.23	43.50	5.27
	164.830	29.34	8.40	1.75	39.49	43.50	4.01
	208.480	28.99	7.63	2.00	38.62	43.50	4.88
	276.380	26.32	12.58	2.38	41.28	46.00	4.72
	446.130	22.75	17.07	2.82	42.64	46.00	3.36
	703.180	17.61	20.13	3.55	41.29	46.00	4.71
Vertical	33.880	14.50	16.12	0.70	31.32	40.00	8.68
	128.940	19.60	11.82	1.53	32.95	43.50	10.55
	218.180	31.68	7.95	2.04	41.67	46.00	4.33
	446.130	22.11	17.07	2.82	42.00	46.00	4.00
	594.540	20.32	18.50	3.20	42.02	46.00	3.98
	701.240	17.94	20.30	3.54	41.78	46.00	4.22

TEST ENGINEER: NEAL WANG

5 DEBUG DESCRIPTION

The following components are used during the countermeasure procedures:

Name	M/N	Manufacturer	Location
Gasket	35x0.7x41mmVGA	Qingdao Joinset S&T Co., Ltd.	See Internal Photos Figure 17
		Shenzhen Tongantai Electronic Technology 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.