

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

LED LCD TV

Model No.	Brand
32K20D, 32K21D, 32K22D, 32K23D, 32K24D, 32K25D, 32H3, 32H3C	Hisense

FCC ID : W9HLCDC0029

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

Prepared By : Audix Technology (Shanghai) Co., Ltd.
3F and 4F, 34Bldg 680 Guiping Rd,
Caohejing Hi-Tech Park,
Shanghai 200233, China

Tel: +86-21-64955500
Fax: +86-21-64955491

Report No. : ACI-F13217A1
Date of Test : Apr 03 – 04, 2014
Date of Report : Apr 21, 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.....	17
4.1 Test Equipment.....	17
4.2 Block Diagram of Test Setup.....	17
4.3 Radiated Emission Limit [FCC Part 15 Subpart B 15.109(a)].....	18
4.4 Test Configuration.....	18
4.5 Operating Condition of EUT.....	18
4.6 Test Procedures.....	19
4.7 Test Results.....	19
5 DEVIATION TO TEST SPECIFICATIONS.....	26

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 Apr 03 – 04, 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.

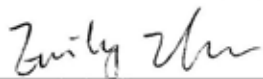
This report contains data that are not covered by the NVLAP accreditation.

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.F13218A1, a Verification report.

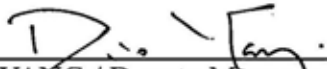
Date of Test : Apr 03 – 04, 2014 Date of Report : Apr 21, 2014

Producer :

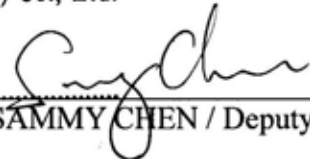

EMILY ZHU / Assistant

Review :

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


DIAO YANG / Deputy Manager

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 : ☒ Production ☐ Pre-product ☐ Pro-type

Model No. : 32K20D, 32K21D, 32K22D, 32K23D,
32K24D, 32K25D, 32H3, 32H3C

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

Report No.	Model No.	Rev. Summary	Edition No.	Data of Rev.
ACI-F13217	32K20D, 32K21D, 32K22D, 32K23D, 32K24D, 32K25D, 32H3, 32H3C, 32H3E, 32H3S, 32H3I	Original Report	0	Dec 30, 2013
ACI-F13217A1	32K20D, 32K21D, 32K22D, 32K23D, 32K24D, 32K25D, 32H3, 32H3C	1. To remove the model 32H3E, 32H3S, 32H3I. 2. To modify panel, main board, tuner, and power board.	Rev. A1	Apr 21, 2014

Note #2 : The above models are all the same except for
model name.
32K20D 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 : HD315DH-E31

Max Resolution : 1920*1080@60Hz

HDMI Cable : Shielded, Detachable, 1.00m

Power Cord : Unshielded, Detachable, 1.80m

Remark:

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

- (1) One USB Port
: Connected with U-Disk
- (2) One component of Audio/YPbPr Audio Port
: Connected with DVD PLAYER
- (3) One component of Video/YPbPr Port
: Connected with DVD PLAYER
- (4) One HDMI1/ARC Port
: Connected with PC
- (5) One HDMI2/MHL Port
: Connected with Smart Mobile Phone
- (6) One DVI AUDIO IN Port
: Connected with PC
- (7) One AUDIO OUT/Earphone Port
: Connected with Earphone
- (8) One ANT/CABLE IN Port
: Connected with Antenna or ATSC SG / TV
SG
- (9) One DIGITAL AUDIO OUT Port
: Connected with DVD PLAYER

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

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

2.2.9 Smart Mobile Phone

Manufacturer : SAMSUNG
Model Number : GT-I9100G
Serial Number : RV1C2250B7J
Certificate : CE/EMC, CCC

2.2.10 Earphone

Manufacturer : Skullcandy
Model Number : FMJ

2.2.11 U-DISK

Manufacturer : LG
Model Number : 1GB

2.3 Description of Test Facility

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

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

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

NVLAP Lab Code : 200371-0

2.4 Measurement Uncertainty

Conducted Emission Expanded Uncertainty: U = 3.02 dB

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

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

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

3 CONDUCTED EMISSION TEST

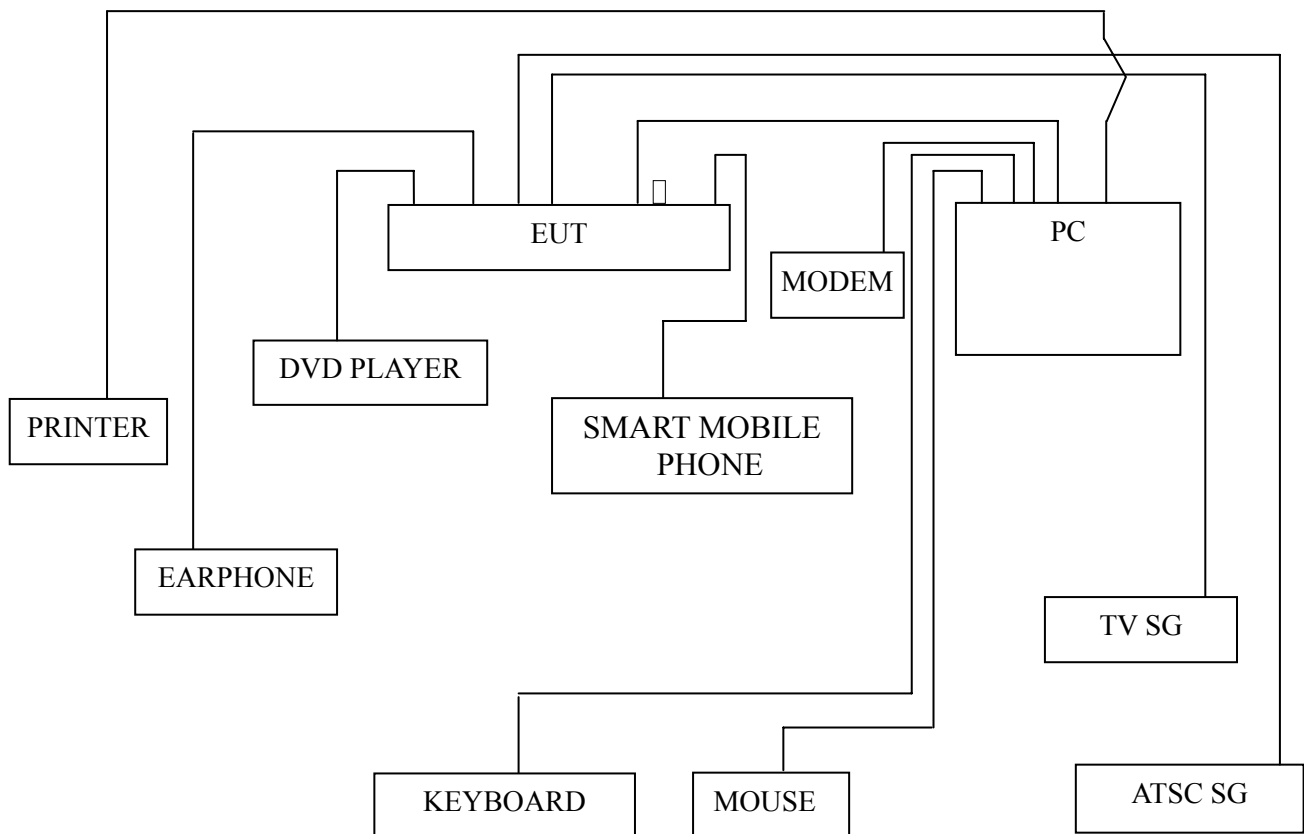
3.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Mar 20, 2014	Mar 19, 2015
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 25, 2014	Feb 24, 2015
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 20, 2014	Mar 19, 2015
4.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426389	Mar 17, 2014	Sep 16, 2014
5.	50 Ω Terminator	Anritsu	BNC	001	Mar 20, 2014	Mar 19, 2015
6.	Software	Audix	E3	6.2009-1-15	--	--

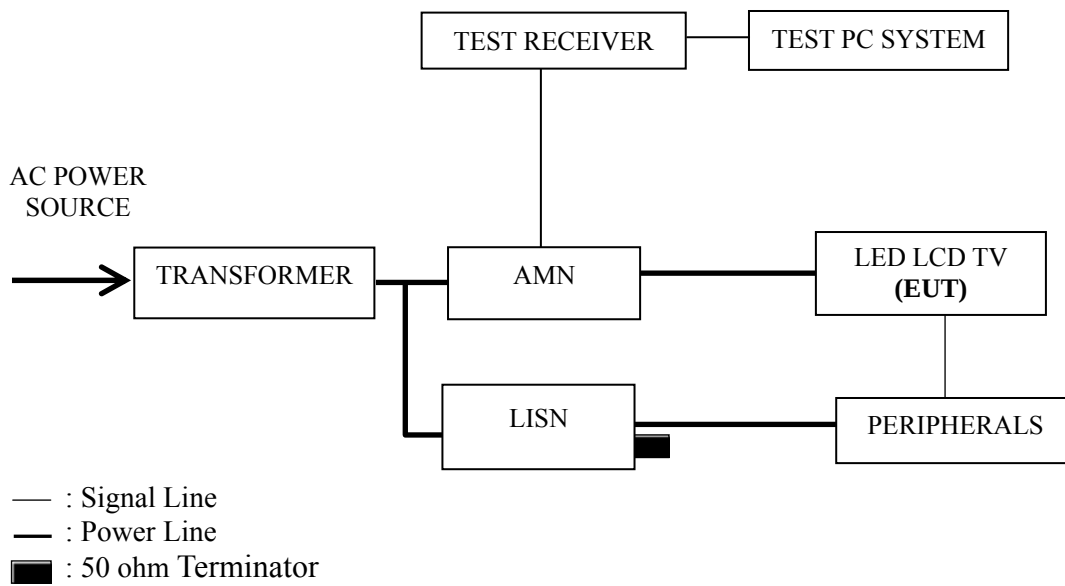
3.2 Block Diagram of Test Setup

3.2.1 EUT & Peripherals



□ : U-Disk

3.2.2 Conducted Disturbance Test Setup



3.3 Conducted Emission Limit [FCC Part 15 Subpart B 15.107(a)]

Frequency Range (MHz)	Limits dB (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 HDMI Input).

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

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

3.5.7 The test modes are as follows:

Test Mode
HDMI 1920*1080@60Hz
HDMI 1280*1024@60Hz
HDMI 640*480@60Hz
USB Play

3.6 Test Procedures

The EUT and peripherals were connected to the power mains through an Artificial Mains Network (AMN). This provided a 50 ohm coupling impedance for the measuring equipment.

Both sides of AC line (Line & Neutral) were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed or manipulated according to ANSI C63.4:2003 during conducted emission test.

The bandwidth of R&S Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7.

3.7 Test Results

< PASS >

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits.

Test Mode	Data Page
HDMI 1920*1080@60Hz	P13
HDMI 1280*1024@60Hz	P14
HDMI 640*480@60Hz	P15
USB Play	P16

NOTE 1 – Factor = Cable Loss + AMN Factor.

NOTE 2 – Emission Level = Meter Reading + Factor.

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

NOTE 4 – The worst case is for HDMI 1920*1080@60Hz test mode. The worst emission is detected at 0.481 MHz (Average Value) with corrected signal level of 36.31 dB (μV) (limit is 46.33 dB (μV)), when the Neutral of the EUT is connected to AMN.

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 48%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Apr 03, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.154	42.40	0.15	42.55	65.80	23.25	QP
	0.199	49.90	0.12	50.02	63.66	13.64	
	0.480	35.20	-0.04	35.16	56.33	21.17	
	1.512	24.80	0.06	24.86	56.00	31.14	
	13.720	37.70	0.03	37.73	60.00	22.27	
	19.930	34.90	-0.05	34.85	60.00	25.15	
	0.154	22.50	0.15	22.65	55.80	33.15	AV
	0.199	38.10	0.12	38.22	53.66	15.44	
	0.480	35.30	-0.04	35.26	46.33	11.07	
	1.512	22.50	0.06	22.56	46.00	23.44	
	13.720	33.90	0.03	33.93	50.00	16.07	
	19.930	29.60	-0.05	29.55	50.00	20.45	
Neutral	0.198	47.20	0.20	47.40	63.69	16.29	QP
	0.271	38.59	0.22	38.81	61.10	22.29	
	0.481	34.90	0.21	35.11	56.33	21.22	
	2.054	23.50	0.17	23.67	56.00	32.33	
	13.840	38.50	0.51	39.01	60.00	20.99	
	19.640	32.30	0.79	33.09	60.00	26.91	
	0.198	34.60	0.20	34.80	53.69	18.89	AV
	0.271	24.79	0.22	25.01	51.10	26.09	
	0.481	36.10	0.21	36.31	46.33	10.02	
	2.054	20.40	0.17	20.57	46.00	25.43	
	13.840	34.10	0.51	34.61	50.00	15.39	
	19.640	26.90	0.79	27.69	50.00	22.31	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 48%RH

Test Mode : HDMI 1280*1024@60Hz Date of Test : Apr 03, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.158	45.70	0.15	45.85	65.59	19.74	QP
	0.200	48.90	0.12	49.02	63.62	14.60	
	0.481	34.90	-0.04	34.86	56.32	21.46	
	1.403	21.20	0.06	21.26	56.00	34.74	
	14.280	37.80	0.02	37.82	60.00	22.18	
	20.150	34.70	-0.07	34.63	60.00	25.37	
	0.158	23.50	0.15	23.65	55.59	31.94	AV
	0.200	38.10	0.12	38.22	53.62	15.40	
	0.481	34.50	-0.04	34.46	46.32	11.86	
	1.403	18.30	0.06	18.36	46.00	27.64	
	14.280	33.30	0.02	33.32	50.00	16.68	
	20.150	29.10	-0.07	29.03	50.00	20.97	
Neutral	0.151	45.90	0.15	46.05	65.96	19.91	QP
	0.198	49.60	0.20	49.80	63.69	13.89	
	0.480	35.20	0.21	35.41	56.34	20.93	
	0.644	31.50	0.14	31.64	56.00	24.36	
	6.715	28.10	0.31	28.41	60.00	31.59	
	13.830	38.60	0.51	39.11	60.00	20.89	
	0.151	31.10	0.15	31.25	55.96	24.71	AV
	0.198	38.20	0.20	38.40	53.69	15.29	
	0.480	34.30	0.21	34.51	46.34	11.83	
	0.644	18.60	0.14	18.74	46.00	27.26	
	6.715	23.70	0.31	24.01	50.00	25.99	
	13.830	34.00	0.51	34.51	50.00	15.49	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 48%RH

Test Mode : HDMI 640*480@60Hz Date of Test : Apr 03, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.199	48.60	0.12	48.72	63.65	14.93	QP
	0.276	37.60	0.07	37.67	60.95	23.28	
	0.481	34.80	-0.04	34.76	56.32	21.56	
	2.159	25.20	0.08	25.28	56.00	30.72	
	14.320	36.30	0.01	36.31	60.00	23.69	
	23.960	33.20	-0.40	32.80	60.00	27.20	
	0.199	38.00	0.12	38.12	53.65	15.53	AV
	0.276	23.20	0.07	23.27	50.95	27.68	
	0.481	34.20	-0.04	34.16	46.32	12.16	
	2.159	22.80	0.08	22.88	46.00	23.12	
	14.320	31.00	0.01	31.01	50.00	18.99	
	23.960	27.20	-0.40	26.80	50.00	23.20	
Neutral	0.198	48.20	0.20	48.40	63.71	15.31	QP
	0.266	36.99	0.22	37.21	61.25	24.04	
	0.481	35.00	0.21	35.21	56.32	21.11	
	2.483	26.20	0.16	26.36	56.00	29.64	
	13.970	38.60	0.51	39.11	60.00	20.89	
	19.590	33.90	0.78	34.68	60.00	25.32	
	0.198	37.50	0.20	37.70	53.71	16.01	AV
	0.266	24.19	0.22	24.41	51.25	26.84	
	0.481	34.20	0.21	34.41	46.32	11.91	
	2.483	23.60	0.16	23.76	46.00	22.24	
	13.970	34.30	0.51	34.81	50.00	15.19	
	19.590	29.00	0.78	29.78	50.00	20.22	

TEST ENGINEER: ERIC TANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 48%RH

Test Mode : USB Play Date of Test : Apr 03, 2014

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.164	48.90	0.14	49.04	65.27	16.23	QP
	0.200	46.90	0.12	47.02	63.61	16.59	
	0.480	34.90	-0.04	34.86	56.33	21.47	
	3.884	26.40	0.17	26.57	56.00	29.43	
	14.200	37.80	0.02	37.82	60.00	22.18	
	19.690	34.49	-0.04	34.45	60.00	25.55	
	0.164	33.00	0.14	33.14	55.27	22.13	AV
	0.200	35.40	0.12	35.52	53.61	18.09	
	0.480	34.30	-0.04	34.26	46.33	12.07	
	3.884	23.80	0.17	23.97	46.00	22.03	
	14.200	32.90	0.02	32.92	50.00	17.08	
	19.690	29.59	-0.04	29.55	50.00	20.45	
Neutral	0.151	44.70	0.15	44.85	65.97	21.12	QP
	0.198	48.80	0.20	49.00	63.69	14.69	
	0.481	35.20	0.21	35.41	56.32	20.91	
	1.618	24.90	0.17	25.07	56.00	30.93	
	13.770	38.40	0.51	38.91	60.00	21.09	
	19.680	34.30	0.79	35.09	60.00	24.91	
	0.151	28.90	0.15	29.05	55.97	26.92	AV
	0.198	37.90	0.20	38.10	53.69	15.59	
	0.481	34.40	0.21	34.61	46.32	11.71	
	1.618	21.50	0.17	21.67	46.00	24.33	
	13.770	34.10	0.51	34.61	50.00	15.39	
	19.680	29.70	0.79	30.49	50.00	19.51	

TEST ENGINEER: ERIC TANG

4 RADIATED EMISSION TEST

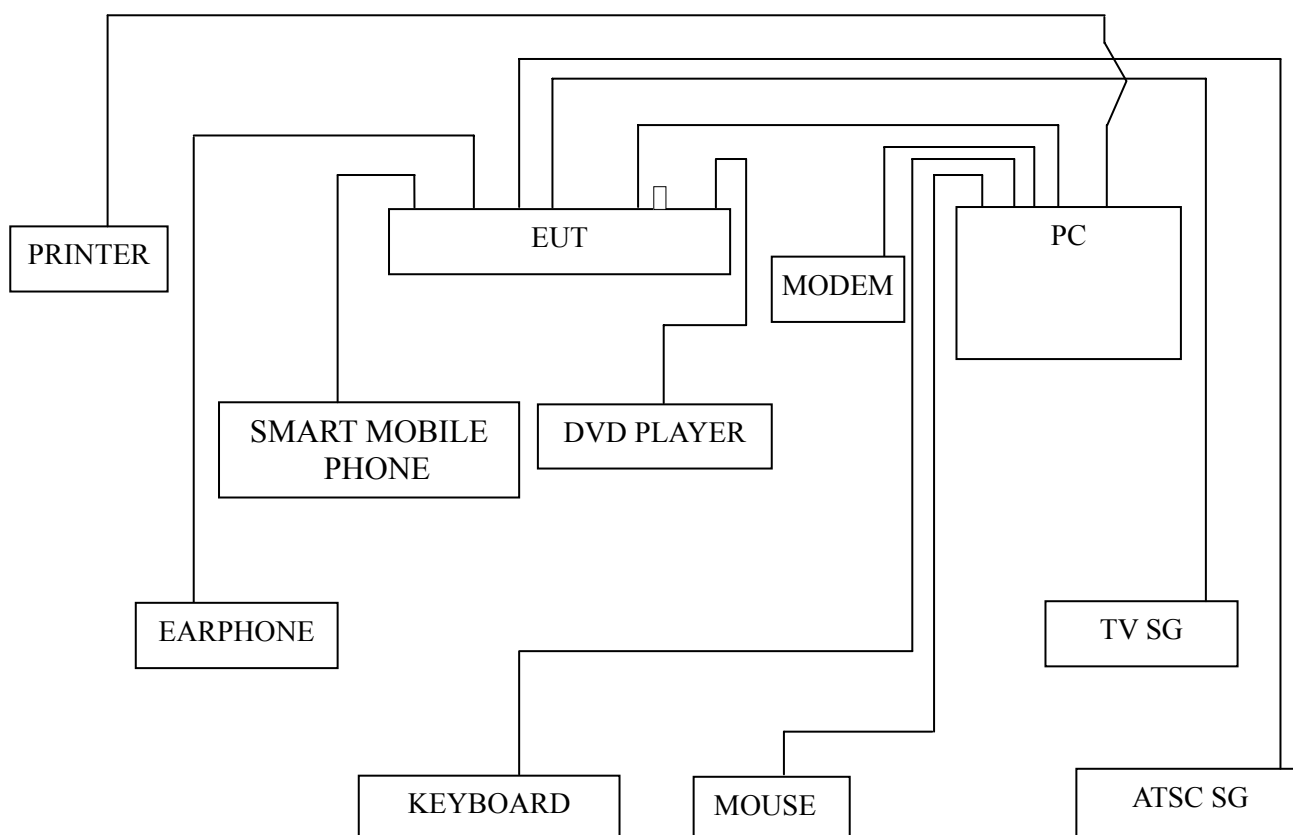
4.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Sep 03, 2013	Sep 02, 2014
2.	Preamplifier	Agilent	8447D	2944A10548	Mar 17, 2014	Sep 16, 2014
3.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2014	Mar 19, 2015
4.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 03, 2013	May 02, 2014
5.	Horn Antenna	EMCO	3115	9607-4878	May 11, 2013	May 10, 2014
6.	Spectrum	Agilent	E7405A	MY45106600	Nov 11, 2013	Nov 10, 2014
7.	50Ω Coaxial Switch	Anritsu	MP59B	6200426390	Mar 17, 2014	Sep 16, 2014
8.	Software	Audix	E3	6.2007-9-10	--	--

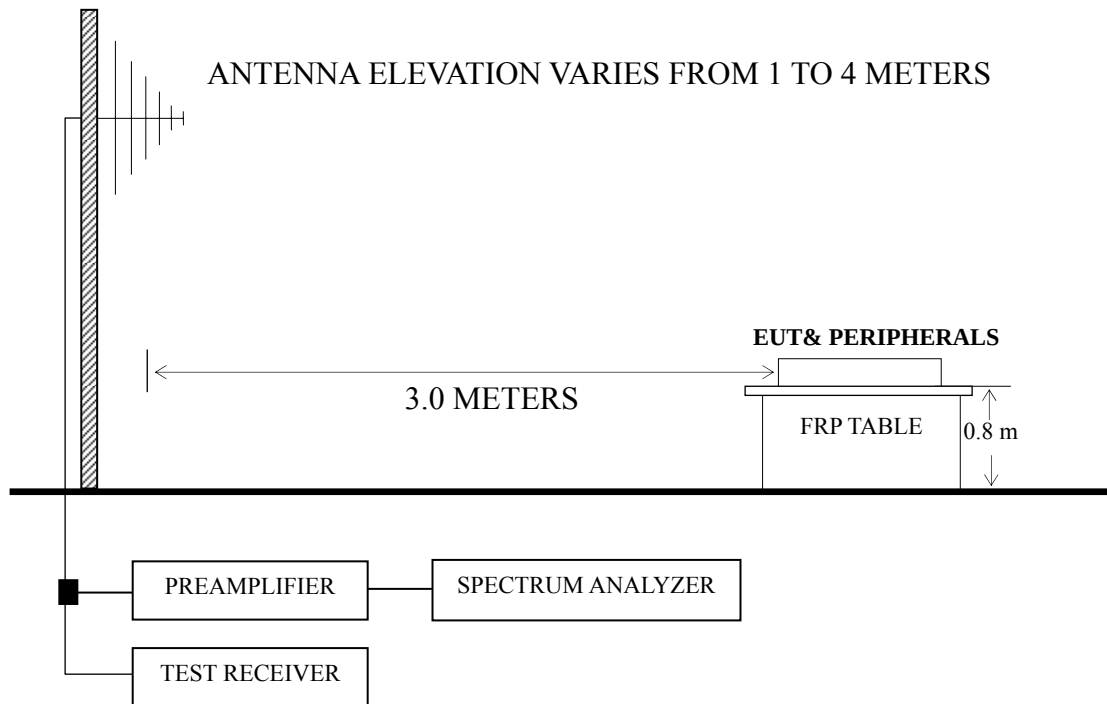
4.2 Block Diagram of Test Setup

4.2.1 EUT & Peripherals



□ : 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	P21 – P22
HDMI 1280*1024@60Hz	P23
HDMI 640*480@60Hz	P24
USB Play	P25

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 354.950 MHz with corrected signal level of 42.83 dB ($\mu\text{V/m}$) (limit is 46.00 dB ($\mu\text{V/m}$)), when the antenna was 1.20 m height and the turntable was at 260°. The worst emission at vertical polarization was detected at 747.800 MHz with corrected signal level of 42.91 dB ($\mu\text{V/m}$) (limit is 46.00 dB ($\mu\text{V/m}$)), when the antenna was 1.10 m height and the turntable was at 60°.

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Apr 04, 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	58.130	25.60	5.58	0.88	--	32.06	40.00	7.94	QP
	94.990	23.52	9.30	1.29	--	34.11	43.50	9.39	
	206.540	25.36	7.75	1.98	--	35.09	43.50	8.41	
	354.950	25.30	14.90	2.63	--	42.83	46.00	3.17	
	569.320	20.04	19.40	3.14	--	42.58	46.00	3.42	
	769.140	20.56	18.30	3.60	--	42.46	46.00	3.54	
	1028.000	47.89	23.81	4.92	38.14	38.48	74.00	35.52	PK
	1116.000	48.13	24.15	5.01	37.94	39.35	74.00	34.65	
	1191.000	46.54	24.48	5.10	37.76	38.36	74.00	35.64	
	1381.000	45.68	25.28	5.55	37.25	39.26	74.00	34.74	
	1453.000	46.37	25.48	5.62	37.03	40.44	74.00	33.56	
	1663.000	51.75	27.43	5.89	36.56	48.51	74.00	25.49	
	1028.000	34.63	23.81	4.92	38.14	25.22	54.00	28.78	AV
	1116.000	35.45	24.15	5.01	37.94	26.67	54.00	27.33	
	1191.000	33.68	24.48	5.10	37.76	25.50	54.00	28.50	
	1381.000	32.89	25.28	5.55	37.25	26.47	54.00	27.53	
	1453.000	33.21	25.48	5.62	37.03	27.28	54.00	26.72	
	1663.000	38.68	27.43	5.89	36.56	35.44	54.00	18.56	

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz Date of Test : Apr 04, 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	38.730	19.15	13.30	0.76	--	33.21	40.00	6.79	QP
	130.880	21.80	11.72	1.55	--	35.07	43.50	8.43	
	309.360	23.21	13.30	2.56	--	39.07	46.00	6.93	
	361.740	24.17	14.97	2.64	--	41.78	46.00	4.22	
	492.690	21.72	17.68	2.96	--	42.36	46.00	3.64	
	747.800	20.53	18.80	3.58	--	42.91	46.00	3.09	
	1031.000	46.37	23.82	4.92	38.14	36.97	74.00	37.03	PK
	1136.000	45.96	24.24	5.05	37.90	37.35	74.00	36.65	
	1302.000	45.86	24.99	5.39	37.47	38.77	74.00	35.23	
	1453.000	45.81	25.48	5.62	37.03	39.88	74.00	34.12	
	1575.000	45.47	26.40	5.66	36.74	40.79	74.00	33.21	
	1936.000	45.07	30.49	6.18	36.17	45.57	74.00	28.43	
	1031.000	33.40	23.82	4.92	38.14	24.00	54.00	30.00	AV
	1136.000	32.82	24.24	5.05	37.90	24.21	54.00	29.79	
	1302.000	32.90	24.99	5.39	37.47	25.81	54.00	28.19	
	1453.000	32.27	25.48	5.62	37.03	26.34	54.00	27.66	
	1575.000	32.81	26.40	5.66	36.74	28.13	54.00	25.87	
	1936.000	32.55	30.49	6.18	36.17	33.05	54.00	20.95	

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 60%RH

Test Mode : HDMI 1280*1024@60Hz Date of Test : Apr 04, 2014

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	62.010	25.00	4.70	0.89	30.59	40.00	9.41
	76.560	24.93	6.59	1.03	32.55	40.00	7.45
	147.370	22.05	10.20	1.63	33.88	43.50	9.62
	320.030	24.60	13.90	2.58	41.08	46.00	4.92
	416.060	17.65	16.75	2.73	37.13	46.00	8.87
	594.540	19.39	18.50	3.20	41.09	46.00	4.91
Vertical	34.850	15.40	15.85	0.71	31.96	40.00	8.04
	89.170	23.17	8.03	1.20	32.40	43.50	11.10
	127.000	20.60	11.70	1.52	33.82	43.50	9.68
	382.110	22.22	15.23	2.66	40.11	46.00	5.89
	515.970	19.61	18.35	3.01	40.97	46.00	5.03
	608.120	19.29	18.40	3.25	40.94	46.00	5.06

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 60%RH

Test Mode : HDMI 640*480@60Hz Date of Test : Apr 04, 2014

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	62.980	26.23	4.70	0.90	31.83	40.00	8.17
	78.500	24.02	6.71	1.05	31.78	40.00	8.22
	140.580	21.87	10.30	1.60	33.77	43.50	9.73
	309.360	23.83	13.30	2.56	39.69	46.00	6.31
	400.540	20.21	16.20	2.69	39.10	46.00	6.90
	588.720	17.44	18.70	3.18	39.32	46.00	6.68
Vertical	34.850	14.42	15.85	0.71	30.98	40.00	9.02
	88.200	22.91	7.92	1.18	32.01	43.50	11.49
	124.090	20.99	11.48	1.50	33.97	43.50	9.53
	382.110	21.98	15.23	2.66	39.87	46.00	6.13
	515.970	17.40	18.35	3.01	38.76	46.00	7.24
	765.260	16.78	18.40	3.59	38.77	46.00	7.23

TEST ENGINEER: NEAL WANG

EUT : LED LCD TV Temperature : 22°C

Model No. : 32K20D Humidity : 60%RH

Test Mode : USB Play Date of Test : Apr 04, 2014

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	63.950	26.01	4.70	0.90	31.61	40.00	8.39
	94.020	22.11	9.12	1.27	32.50	43.50	11.00
	138.640	23.35	10.51	1.59	35.45	43.50	8.05
	208.480	23.15	7.63	2.00	32.78	43.50	10.72
	312.270	20.90	13.45	2.57	36.92	46.00	9.08
	514.030	14.62	18.38	3.01	36.01	46.00	9.99
Vertical	36.790	15.82	14.92	0.74	31.48	40.00	8.52
	64.920	25.05	4.70	0.90	30.65	40.00	9.35
	93.050	24.02	8.94	1.26	34.22	43.50	9.28
	135.730	21.86	10.91	1.57	34.34	43.50	9.16
	382.110	19.32	15.23	2.66	37.21	46.00	8.79
	506.270	15.93	18.30	3.00	37.23	46.00	8.77

TEST ENGINEER: NEAL WANG

5 DEVIATION TO TEST SPECIFICATIONS

None.