

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

LED LCD TV

Model No.	Brand
LC-32N4000U	Sharp
32H4C, 32H4C+, 32H4CA	Hisense

FCC ID : W9HLCDC0037

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

Prepared By : Audix Technology (Shanghai) Co., Ltd.
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Report No. : ACI-F16120A1
Date of Test : Jul 08-09, 2016
Date of Report : Jul 12, 2016

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TEST REPORT FOR FCC CERTIFICATE

Applicant : Hisense Electric Co., Ltd.
Manufacturer : Hisense Electric Co., Ltd.
Factory #1 : Hisense Electric Co., Ltd.
Factory #2 : Tatung Mexico S.A. de C.V.
Factory #3 : HISENSE ELECTRONICA MEXICO, S.A. DE C.V.
EUT Description : LED LCD TV

Model No.	Brand	Power Supply
LC-32N4000U	Sharp	120V/60Hz
32H4C, 32H4C+, 32H4CA	Hisense	

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 2015
AND ANSI C63.4-2014*

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 Jul 08-09, 2016 is technically compliance with the FCC official limits also.

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

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

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.F16121A1, a Verification report.

Date of Test : Jul 08-09, 2016 Date of Report : Jul 12, 2016

Producer :

Tina Liang
TINA LIANG / Assistant

Review :

Byron Wu
BYRON WU / Deputy Assistant Manager



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

Signatory :

Sammy Chen
Authorized Signature EMC SAMMY CHEN / 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 2015 AND ANSI C63.4-2014	15.107(a) Class B	Pass
Radiated Disturbance	FCC RULES AND REGULATIONS PART 15 SUBPART B OCTOBER 2015 AND ANSI C63.4-2014	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	LC-32N4000U	32H4C, 32H4C+, 32H4CA
Brand	Sharp	Hisense

Note #1 : The above models are all the same except for brand and model number. LC-32N4000U model is tested and recorded in the report

Note #2 : “+” represents any of the Arabic numeral or the blank space.

Note #3 : The modified histories of report are as follows:

Report No.	Model No.	Rev. Summary	Edition No.	Data of Rev.
ACI-F16120	LC-32N4000U 32H4C, 32H4C+, 32H4CA	Original Report	0	May 18, 2016
ACI-F16120A1	LC-32N4000U 32H4C, 32H4C+, 32H4CA	To add one filter	Rev. A1	Jul 12, 2016

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

Manufacturer : Same as Applicant

Factory #1 : Same as Applicant

Factory #2 : Tatung Mexico S.A. de C.V.
Miguel Catalán 420, Parque Industrial Rio Bravo,
Cd. Juarez, Chih., CP 32557

Factory #3 : HISENSE ELECTRONICA MEXICO, S.A. DE C.V.
Blvd. Sharp #3510 Parque Industrial
Rosarito, C.P. 22710 Playas de Rosarito, B.C.

LCD Panel : Manufacturer : Hisense
M/N : HD315DH-B12(010)

Tuner : Manufacturer : XuGuang Tech. Co., Ltd
M/N : HFT-96S3/W11FJ4H/ROH

Max Resolution : 1920*1080@60Hz

HDMI Cable*3 (Lab provide)	:	Shielded, Detachable, 1.50m
Power Cord	:	Unshielded, Detachable, 1.80m, 2C
USB Cable (Lab provide)	:	Shielded, Detachable, 1.00m

Remark:

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

Side Port:

- | | | |
|-------------------------|---|-----------------------------------|
| (1) One AUDIO OUT Port | : | Connected with Earphone #1 |
| (2) One ANT Port | : | Connected with Antenna or ATSC SG |
| (3) One HDMI1 Port | : | Connected with DVD PLAYER #1 |
| (4) One HDMI 2 Port | : | Connected with PC |
| (5) One HDMI 3/ARC Port | : | Connected with DVD PLAYER #2 |

Bottom Port:

- | | | |
|--------------------------------|---|--|
| (6) One Digital Audio Out Port | : | Connected with Audio Converter to Earphone |
| (7) One AV IN Port | : | Connected with DVD PLAYER #1 |
| (8) One USB Port | : | Connected with Hard-Disk |

2.2 Peripherals

2.2.1 PC

Manufacturer	:	HP
Model Number	:	DX7400MT
Serial Number	:	CNG8130K89
Power Cord	:	Unshielded, Detachable, 1.8m
Certificate	:	FCC DoC; CE/EMC; VCCI; C-Tick

2.2.2 Printer

Manufacturer	:	HP
Model Number	:	P1007
Serial Number	:	VNFN713831
Power Cord	:	Unshielded, Detachable, 1.8m
Certificate	:	GS, FCC DoC; CE/EMC; C-Tick

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, 1.5m
Certificate : CCC

2.2.6 Earphone*2

Manufacturer : Edifier
Model Number : H210

2.2.7 TV Signal Generator

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

2.2.8 ATSC Signal Generator

Manufacturer : SENCORE
Model Number : ATSC997
Serial Number : 6790071

2.2.9 DVD PLAYER #1

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

2.2.10 DVD PLAYER #2

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

2.2.11 Hard Disk

Manufacturer : Tetasys
Model Number : F12
Serial Number : A010022-486006
Data Cable : Shielded, Undetachable, 1.8m.
Certificate : CE, FCC DoC

2.3 Description of Test Facility

Site Description : Sept. 17, 1998 file on
(No.3 3m Chamber) Jan.15, 2015 Renewed
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046, USA

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

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

FCC registration Number : 91789

NVLAP Lab Code : 200371-0

2.4 Measurement Uncertainty

Conducted Emission Expanded Uncertainty : U = 3.4dB

Radiated Emission Expanded Uncertainty (30-200MHz):
U = 4.6dB(Horizontal)
U = 4.3dB (Vertical)

Radiated Emission Expanded Uncertainty (200M-1GHz):
U = 4.5dB (Horizontal)
U = 5.4dB (Vertical)

Radiated Emission Expanded Uncertainty (1GHz-6GHz):
U = 5.1dB

3 CONDUCTED EMISSION TEST

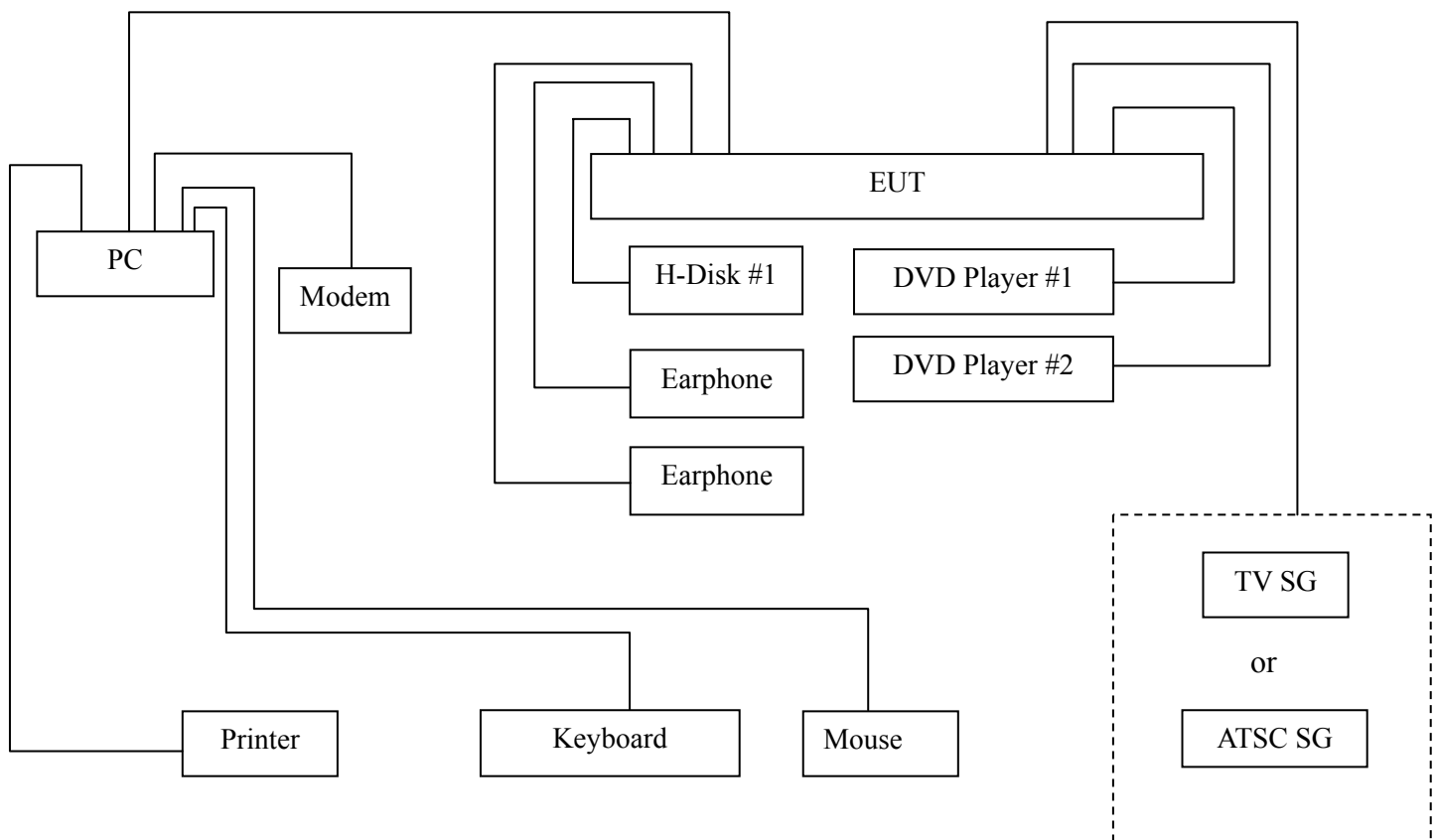
3.1 Test Equipment

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

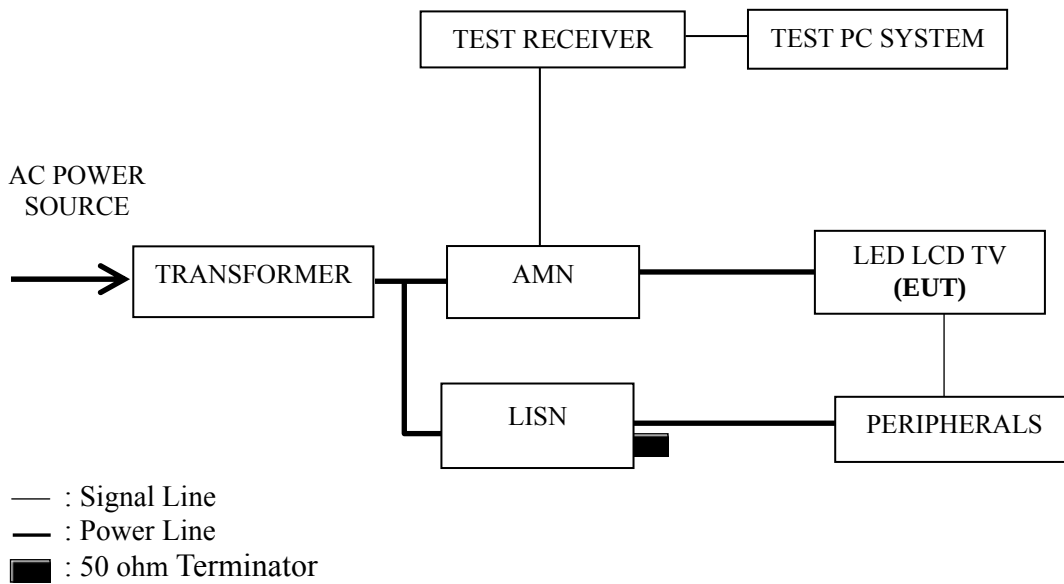
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Apr 27, 2016	Apr 26, 2017
2.	Artificial Mains Network (AMN)	R&S	ENV4200	100125	Jun 25, 2016	Jun 24, 2017
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 20, 2016	Mar 19, 2017
4.	50Ω Terminator	Anritsu	BNC	001	Mar 20, 2016	Mar 19, 2017
5.	Software	Audix	e3	6.111206	--	--

3.2 Block Diagram of Test Setup

3.2.1 EUT & Peripherals



3.2.2 Conducted Disturbance Test Setup



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

Frequency Range (MHz)	Limits dB (μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 30	60	50
NOTE 1 – The lower limit shall apply at the transition frequencies. NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz		

3.4 Test Configuration

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

3.5 Operating Condition of EUT

- 3.5.1 Setup the EUT and peripherals as shown in Sec. 3.2.
- 3.5.2 Turn on the power of all equipments and the EUT.
- 3.5.3 Set the contrast & brightness of EUT to maximum.
- 3.5.4 PC system ran the self-test program “EMC Test” by windows XP and sent “H” characters to EUT through graphic card, the EUT’s screen displayed and filled with “H” pattern by its resolution (Via HDMI Input).
- 3.5.5 PC system sent the 1kHz audio signal to EUT through audio port, the EUT speak out 1kHz audio signal.
- 3.5.6 The other peripherals devices were driven and operated during the test.

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 C63.4:2014 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.

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 emission is detected at 0.193MHz (Quasi-Peak Value) with corrected signal level of 47.24 dB (μV) (limit is 63.92 dB (μV)), when the Line of the EUT is connected to AMN.

EUT : LED LCD TV Temperature : 23°C

Model No. : LC-32N4000U Humidity : 52%RH

Test Mode : HDMI 1920*1080@60Hz & 1kHz Playing Date of Test : Jul 08, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.193	36.70	10.54	47.24	63.92	16.68	QP
	0.323	27.69	10.47	38.16	59.63	21.47	
	0.517	21.00	10.40	31.40	56.00	24.60	
	2.017	16.30	10.41	26.71	56.00	29.29	
	4.787	22.20	10.45	32.65	56.00	23.35	
	7.158	23.70	10.47	34.17	60.00	25.83	
	0.193	20.00	10.54	30.54	53.92	23.38	
	0.323	10.89	10.47	21.36	49.63	28.27	AV
	0.517	7.30	10.40	17.70	46.00	28.30	
	2.017	3.90	10.41	14.31	46.00	31.69	
	4.787	11.90	10.45	22.35	46.00	23.65	
	7.158	15.60	10.47	26.07	50.00	23.93	
Neutral	0.191	35.80	10.53	46.33	64.00	17.67	QP
	0.255	31.31	10.48	41.79	61.58	19.79	
	0.443	24.50	10.41	34.91	57.00	22.09	
	0.883	22.90	10.40	33.30	56.00	22.70	
	4.786	28.20	10.50	38.70	56.00	17.30	
	7.055	25.90	10.53	36.43	60.00	23.57	
	0.191	19.30	10.53	29.83	54.00	24.17	AV
	0.255	15.21	10.48	25.69	51.58	25.89	
	0.443	10.60	10.41	21.01	47.00	25.99	
	0.883	9.30	10.40	19.70	46.00	26.30	
	4.786	17.30	10.50	27.80	46.00	18.20	
	7.055	17.20	10.53	27.73	50.00	22.27	

TEST ENGINEER: SENVEN LU

4 RADIATED EMISSION TEST

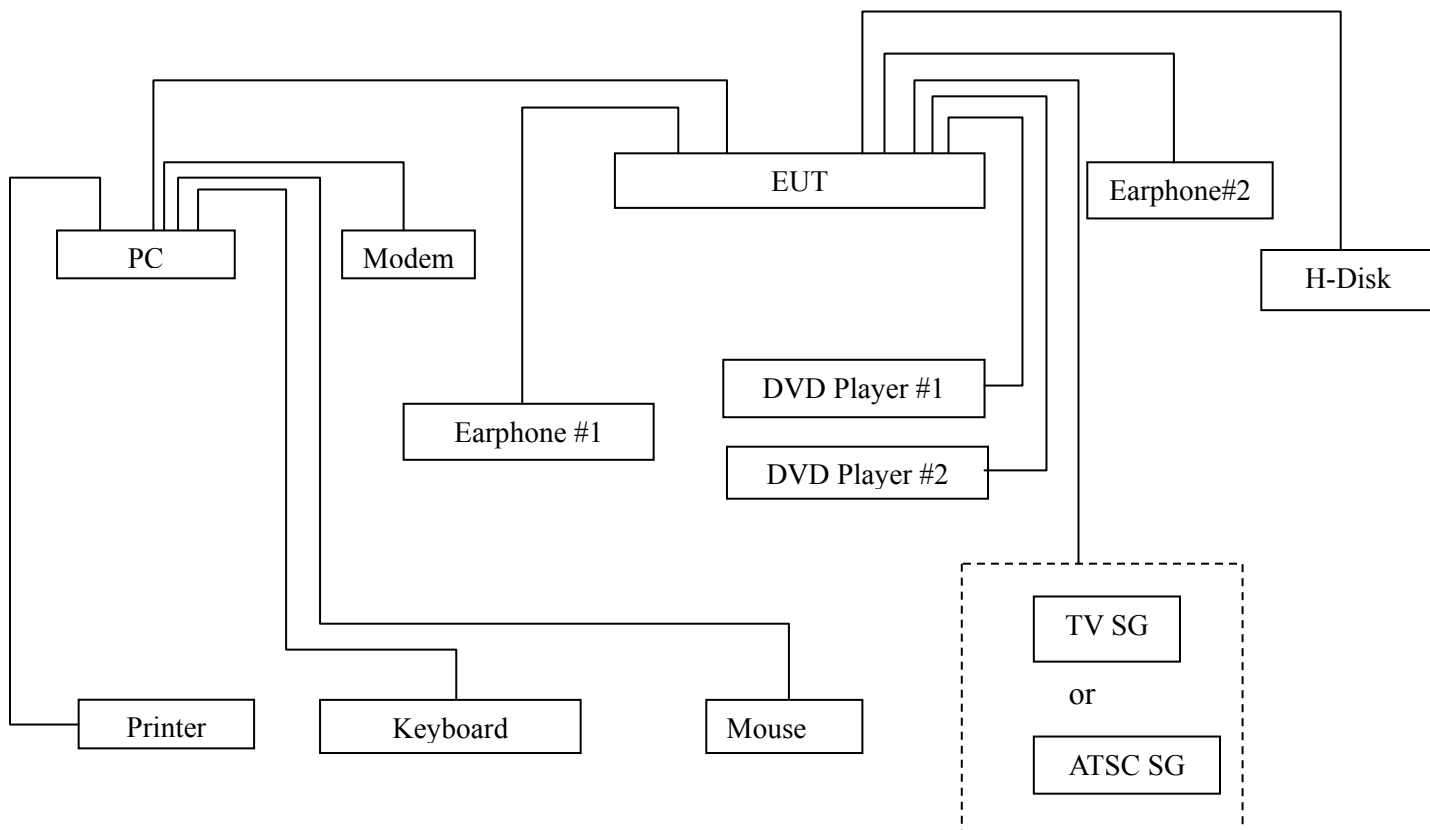
4.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101303	May 07, 2016	May 06, 2017
2.	Preamplifier	Agilent	8447D	2944A06664	Apr 27, 2016	Apr 26, 2017
3.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2016	Sep 19, 2016
4.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 15, 2016	May 14, 2017
5.	Horn Antenna	EMCO	3115	9607-4878	Jun 03, 2016	Jun 02, 2017
6.	Spectrum	Agilent	E7405A	MY45106600	Jun 12, 2016	Jun 11, 2017
7.	Software	Audix	e3	6.2007-9-10	--	--

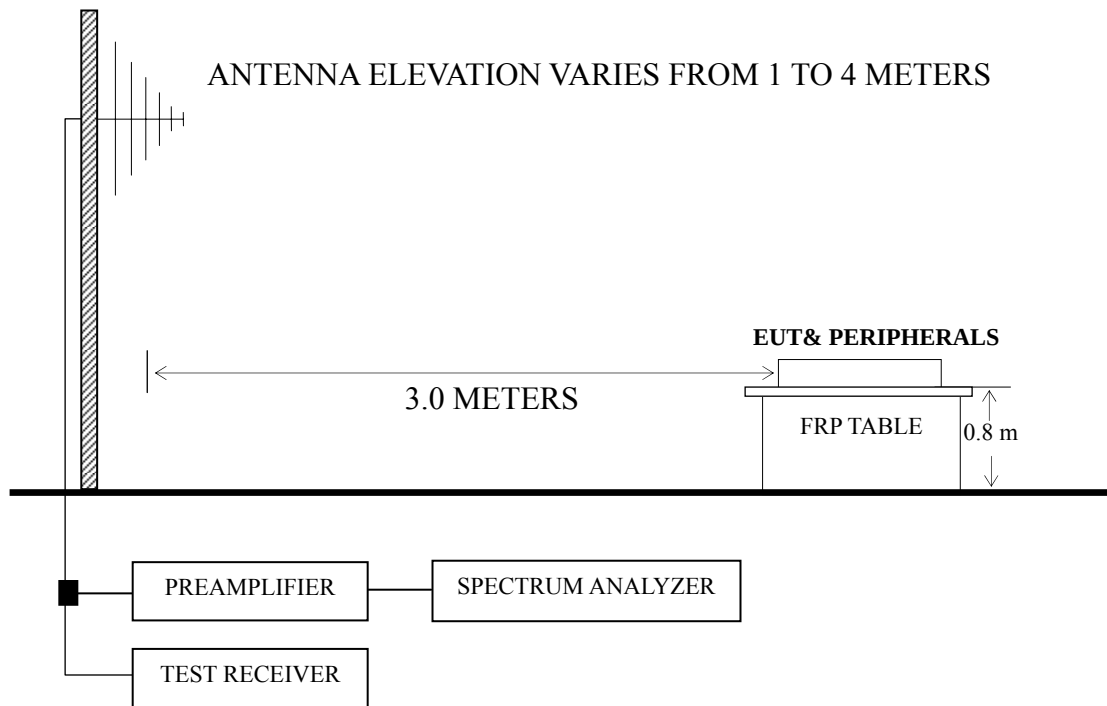
4.2 Block Diagram of Test Setup

4.2.1 EUT & Peripherals



4.2.2 Radiated emission test setup

4.2.2.1 Below 1GHz



■ : 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 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.

NOTE 1 – Emission Level = Antenna Factor + Cable Loss + 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 emission at horizontal polarization was detected at 148.441 MHz with corrected signal level of 40.15 dB (μV/m) (limit is 43.50 dB (μV/m)), when the antenna was 1.60 m height and the turntable was at 45°. The worst emission at vertical polarization was detected at 312.179MHz with corrected signal level of 41.19 dB (μV/m) (limit is 46.00 dB (μV/m)), when the antenna was 1.00 m height and the turntable was at 330°.

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-32N4000U Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz & 1kHz Playing Date of Test : Jul 09, 2016

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	78.689	22.59	9.17	1.07	--	32.83	40.00	7.17	QP
	148.441	26.88	11.65	1.62	--	40.15	43.50	3.35	
	379.914	21.09	16.50	2.69	--	40.28	46.00	5.72	
	477.169	20.35	17.46	2.90	--	40.71	46.00	5.29	
	629.477	16.20	19.50	2.64	--	38.34	46.00	7.66	
	893.857	13.17	21.30	4.46	--	38.93	46.00	7.07	
	1047.688	67.05	23.74	4.55	36.41	58.93	74.00	15.07	PK
	1217.858	63.67	24.52	3.54	36.10	55.63	74.00	18.37	
	1582.001	59.19	25.96	3.98	35.58	53.55	74.00	20.45	
	1047.688	49.00	23.74	4.55	36.41	40.88	54.00	13.12	AV
	1217.858	45.84	24.52	3.54	36.10	37.80	54.00	16.20	
	1582.001	41.30	25.96	3.98	35.58	35.66	54.00	18.34	

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-32N4000U Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz & 1kHz Playing Date of Test : Jul 09, 2016

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	80.927	24.03	9.46	1.09	--	34.58	40.00	5.42	QP
	157.559	24.59	11.15	1.68	--	37.42	43.50	6.08	
	203.523	25.38	9.77	1.98	--	37.13	43.50	6.37	
	312.179	24.38	14.20	2.61	--	41.19	46.00	4.81	
	374.623	21.60	16.39	2.69	--	40.68	46.00	5.32	
	478.846	20.57	17.50	2.90	--	40.97	46.00	5.03	
	1231.021	60.01	24.58	3.56	36.08	52.07	74.00	21.93	PK
	1584.838	58.93	25.96	4.01	35.57	53.33	74.00	20.67	
	1742.717	59.50	26.59	4.11	35.38	54.82	74.00	19.18	
	1231.021	42.19	24.58	3.56	36.08	34.25	54.00	19.75	AV
	1584.838	40.04	25.96	4.01	35.57	34.44	54.00	19.56	
	1742.717	40.28	26.59	4.11	35.38	35.60	54.00	18.40	

TEST ENGINEER: CAESAR WU

5 DEVIATION TO TEST SPECIFICATIONS

None.