

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

LED LCD TV

Model No.: LC-70N7100U

Brand: Sharp

FCC ID : W9HLCDF0083

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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	:	<input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-product <input type="checkbox"/> Pro-type
Model No	:	LC-70N7100U
Note	:	The EUT has two type, their difference is IR board and stand, refer to appendix figure 34, 35, 36, 37.
Brand	:	Sharp
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 : HD700IU-B41(110)
Tuner	:	Manufacturer : SILICON LABS M/N : Si2151
Max Resolution	:	3840*2160@60Hz
HDMI Cable*4 (Lab provide)	:	Shielded, Detachable, 1.50m
Power Cord	:	Unshielded, Detachable, 1.80m, 2C
USB Cable*3 (Lab provide)	:	Shielded, Detachable, 1.00m
LAN Cable	:	Shielded, Detachable, 1.50m
MHL to HDMI Adaptor: with RCP (Lab provide)	:	Manufacture: CE-Link M/N: 3002

Remark:

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

Side Port:

- (1) One USB3 Port : Connected with Hard-Disk #1
- (2) One HDMI2/ARC Port : Connected with DVD PLAYER #2
- (3) One HDMI1/MHL Port : Connected with Smart Mobile Phone
- (4) One Audio out Port : Connected with Earphone
- (5) One Service Port : Do not open to customer
- (6) One USB1 Port : Connected with Hard-Disk #2
- (7) One USB2 Port : Connected with Hard-Disk #3
- (8) One ANT/CABLE IN Port : Connected with ATSC SG / TV SG

Back Port:

- (9) One LAN Port : Connected with PC
- (10) One HDMI3 Port : Connected with DVD PLAYER #1
- (11) One HDMI4 Port : Connected with PC
- (12) One Digital Audio Out Port : Connected with Audio Converter to Earphone
- (13) One component of YPbPr +Video Port : Connected with DVD PLAYER #2
- (14) One AV Port : Connected with DVD PLAYER #1

2.2 Peripherals

2.2.1 PC

Manufacturer : HP
 Model Number : Pro3340
 Serial Number : 6CR2512VFD
 Power Cord : Unshielded, Detachable, 1.8m
 Certificate : FCC DoC; CE/EMC; VCCI; C-Tick

2.2.2 Keyboard

Manufacturer : Microsoft
 Model Number : RT2300
 Serial Number : 7668200662248
 Data Cable : Shielded, Detachable, 1.5m
 Certificate : CE/EMC, FCC DoC, VCCI, MIC, C-Tick, BSMI

2.2.3 Mouse

Manufacturer : Microsoft
Model Number : RT2300
Serial Number : 6965712071551
Data Cable : Shielded, Detachable, 1.5m.
Certificate : CE/EMC, FCC DoC, VCCI, MIC,
C-Tick, BSMI

2.2.4 Modem

Manufacturer : TP-LINK
Model Number : TM-EC5658V
Serial Number : 07123301053
Data Cable : Shielded, Detachable, 1.5m
Certificate : CCC

2.2.5 Earphone *2

Manufacturer : EDIFIER
Model Number : H210

2.2.6 DVD PLAYER #1

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

2.2.7 DVD PLAYER #2

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

2.2.8 Hard Disk #1

Manufacturer : Tetasys
Model Number : F12
Serial Number : A010022-4860010X
Data Cable : Shielded, Undetachable, 1.8m.
Certificate : CE, FCC DoC

2.2.9 Hard Disk #2

Manufacturer : Tetasys
Model Number : F12
Serial Number : A010022-4A60007
Data Cable : Shielded, Undetachable, 1.8m.
Certificate : CE, FCC DoC

2.2.10 Hard Disk #3

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

2.2.11 Smart Mobile Phone

Manufacturer : SAMSUNG
Model Number : GT-I9100G
Serial Number : 6935152011519
Certificate : CE/EMC

2.2.12 ATSC Signal Generator

Manufacturer : SENCORE
Model Number : ATSC997
Serial Number : 6790071

2.2.13 TV Signal Generator

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

2.3 Description of Test Facility

Site Description (No.3 3m Chamber)	:	Sept. 17, 1998 file on 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

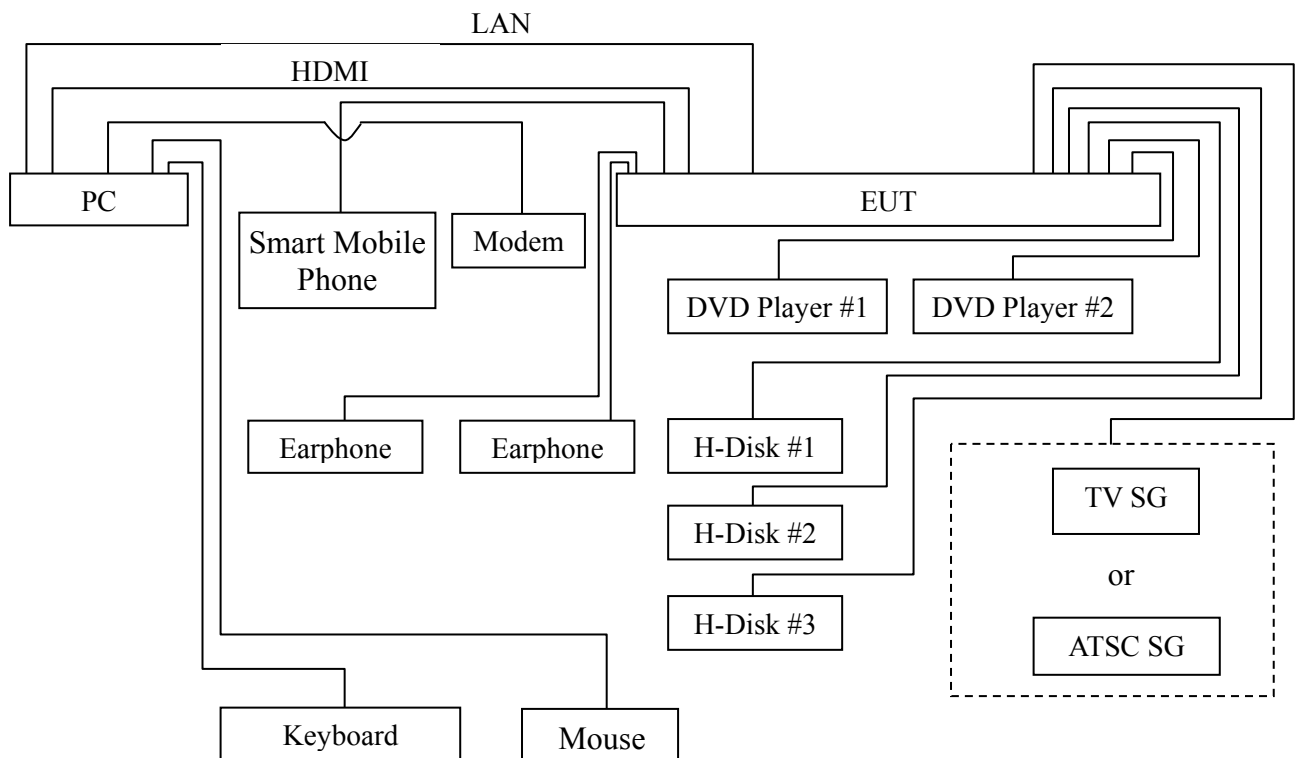
3.1 Test Equipment

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

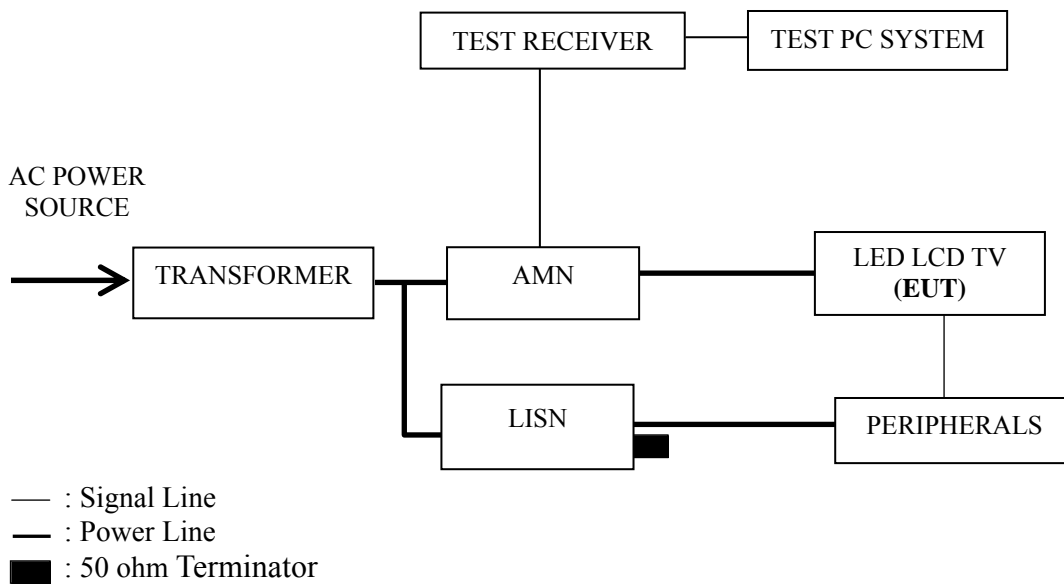
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Jul 03, 2015	Jul 02, 2016
2.	Artificial Mains Network (AMN)	R&S	ENV4200	100125	Jun 27, 2015	Jun 26, 2016
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 20, 2016	Mar 19, 2017
4.	50Ω Terminator	Anritsu	BNC	001	Mar 18, 2015	Sep 17, 2016
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 (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 PC system sent the 1kHz audio signal to EUT through audio port, the EUT speak out 1kHz audio signal.
- 3.5.6 In USB Play mode, set the EUT play digital media from H-Disk.
- 3.5.7 In LAN Play mode, set the EUT play digital media through LAN port.
- 3.5.8 In MHL mode, set the EUT play digital media from mobile phone.
- 3.5.9 The other peripherals devices were driven and operated during the test.
- 3.5.10 The test modes are as follows:

Test Mode
HDMI 3840*2160@60Hz & 1kHz playing
HDMI 1920*1080@60Hz & 1kHz playing
HDMI 1280*1024@60Hz & 1kHz playing
HDMI 640*480@60Hz & 1kHz playing
HDMI1080P
USB Play
LAN Play
MHL

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 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 3840*2160@60Hz & 1kHz playing	P14
HDMI 1920*1080@60Hz & 1kHz playing	P15
HDMI 1280*1024@60Hz & 1kHz playing	P16
HDMI 640*480@60Hz & 1kHz playing	P17
HDMI1080P	P18
USB Play	P19
LAN Play	P20
MHL	P21

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 USB Play test mode. The worst emission is detected at 0.297MHz (Average Value) with corrected signal level of 47.25dB (μ V) (limit is 50.32 dB (μ V)), when the Neutral of the EUT is connected to AMN.

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 48%RH

Test Mode : HDMI 3840*2160@60Hz & 1kHz Playing Date of Test : Jun 23, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.151	40.10	10.59	50.69	65.93	15.24	QP
	0.301	36.80	10.47	47.27	60.22	12.95	
	0.902	33.60	10.39	43.99	56.00	12.01	
	1.088	33.30	10.39	43.69	56.00	12.31	
	1.870	32.00	10.42	42.42	56.00	13.58	
	24.310	26.10	10.74	36.84	60.00	23.16	
	0.151	27.20	10.59	37.79	55.93	18.14	AV
	0.301	34.10	10.47	44.57	50.22	5.65	
	0.902	28.07	10.39	38.46	46.00	7.54	
	1.088	27.70	10.39	38.09	46.00	7.91	
	1.870	20.20	10.42	30.62	46.00	15.38	
	24.310	14.30	10.74	25.04	50.00	24.96	
Neutral	0.151	41.00	10.59	51.59	65.97	14.38	QP
	0.298	37.00	10.45	47.45	60.30	12.85	
	0.899	32.30	10.38	42.68	56.00	13.32	
	1.275	33.49	10.40	43.89	56.00	12.11	
	3.032	32.91	10.44	43.35	56.00	12.65	
	23.110	27.80	10.80	38.60	60.00	21.40	
	0.151	29.10	10.59	39.69	55.97	16.28	AV
	0.298	32.10	10.45	42.55	50.30	7.75	
	0.899	17.90	10.38	28.28	46.00	17.72	
	1.275	25.09	10.40	35.49	46.00	10.51	
	3.032	20.81	10.44	31.25	46.00	14.75	
	23.110	18.30	10.80	29.10	50.00	20.90	

TEST ENGINEER: SEVEN LU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 48%RH

Test Mode : HDMI 1920*1080@60Hz & 1kHz Playing Date of Test : Jun 23, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.151	41.50	10.59	52.09	65.97	13.88	QP
	0.293	38.91	10.47	49.38	60.45	11.07	
	0.679	35.70	10.39	46.09	56.00	9.91	
	1.456	32.90	10.41	43.31	56.00	12.69	
	3.030	34.40	10.45	44.85	56.00	11.15	
	24.840	24.40	10.75	35.15	60.00	24.85	
	0.151	29.70	10.59	40.29	55.97	15.68	AV
	0.293	35.51	10.47	45.98	50.45	4.47	
	0.679	27.50	10.39	37.89	46.00	8.11	
	1.456	19.80	10.41	30.21	46.00	15.79	
	3.030	23.60	10.45	34.05	46.00	11.95	
	24.840	15.60	10.75	26.35	50.00	23.65	
Neutral	0.151	41.10	10.59	51.69	65.97	14.28	QP
	0.298	37.10	10.45	47.55	60.29	12.74	
	0.883	33.50	10.38	43.88	56.00	12.12	
	1.082	32.80	10.38	43.18	56.00	12.82	
	3.038	32.91	10.44	43.35	56.00	12.65	
	23.810	26.90	10.82	37.72	60.00	22.28	
	0.151	29.30	10.59	39.89	55.97	16.08	AV
	0.298	30.50	10.45	40.95	50.29	9.34	
	0.883	26.20	10.38	36.58	46.00	9.42	
	1.082	22.10	10.38	32.48	46.00	13.52	
	3.038	20.41	10.44	30.85	46.00	15.15	
	23.810	17.50	10.82	28.32	50.00	21.68	

TEST ENGINEER: SEVEN LU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 48%RH

Test Mode : HDMI 1280*1024@60Hz & 1kHz Playing Date of Test : Jun 23, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.151	40.60	10.59	51.19	65.96	14.77	QP
	0.298	38.50	10.47	48.97	60.29	11.32	
	0.688	32.80	10.39	43.19	56.00	12.81	
	1.289	33.00	10.40	43.40	56.00	12.60	
	3.038	32.60	10.45	43.05	56.00	12.95	
	24.180	26.89	10.74	37.63	60.00	22.37	
	0.151	28.90	10.59	39.49	55.96	16.47	AV
	0.298	36.00	10.47	46.47	50.29	3.82	
	0.688	27.50	10.39	37.89	46.00	8.11	
	1.289	24.10	10.40	34.50	46.00	11.50	
	3.038	20.10	10.45	30.55	46.00	15.45	
	24.180	15.49	10.74	26.23	50.00	23.77	
Neutral	0.151	40.60	10.59	51.19	65.93	14.74	QP
	0.299	38.70	10.45	49.15	60.26	11.11	
	0.900	33.80	10.38	44.18	56.00	11.82	
	1.074	33.50	10.38	43.88	56.00	12.12	
	2.269	32.30	10.43	42.73	56.00	13.27	
	23.280	27.20	10.80	38.00	60.00	22.00	
	0.151	27.90	10.59	38.49	55.93	17.44	AV
	0.299	36.20	10.45	46.65	50.26	3.61	
	0.900	27.50	10.38	37.88	46.00	8.12	
	1.074	25.10	10.38	35.48	46.00	10.52	
	2.269	21.10	10.43	31.53	46.00	14.47	
	23.280	16.30	10.80	27.10	50.00	22.90	

TEST ENGINEER: SEVEN LU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 48%RH

Test Mode : HDMI 640*480@60Hz & 1kHz Playing Date of Test : Jun 23, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.151	39.30	10.59	49.89	65.97	16.08	QP
	0.299	38.30	10.47	48.77	60.27	11.50	
	0.900	33.60	10.39	43.99	56.00	12.01	
	1.495	33.30	10.41	43.71	56.00	12.29	
	2.890	32.70	10.45	43.15	56.00	12.85	
	25.450	24.80	10.78	35.58	60.00	24.42	
	AV	0.151	28.90	10.59	39.49	55.97	16.48
		0.299	25.40	10.47	35.87	50.27	14.40
		0.900	26.70	10.39	37.09	46.00	8.91
		1.495	24.90	10.41	35.31	46.00	10.69
		2.890	19.90	10.45	30.35	46.00	15.65
		25.450	14.90	10.78	25.68	50.00	24.32
Neutral	0.150	41.20	10.59	51.79	65.98	14.19	QP
	0.299	38.80	10.45	49.25	60.28	11.03	
	0.885	33.50	10.38	43.88	56.00	12.12	
	1.289	33.59	10.40	43.99	56.00	12.01	
	2.278	31.20	10.43	41.63	56.00	14.37	
	23.740	27.00	10.82	37.82	60.00	22.18	
	AV	0.150	29.30	10.59	39.89	55.98	16.09
		0.299	25.60	10.45	36.05	50.28	14.23
		0.885	27.70	10.38	38.08	46.00	7.92
		1.289	23.39	10.40	33.79	46.00	12.21
		2.278	20.10	10.43	30.53	46.00	15.47
		23.740	16.70	10.82	27.52	50.00	22.48

TEST ENGINEER: SEVEN LU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 48%RH

Test Mode : HDMI 1080P Date of Test : Jun 23, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.152	40.30	10.59	50.89	65.88	14.99	QP
	0.292	39.41	10.47	49.88	60.46	10.58	
	0.679	35.50	10.39	45.89	56.00	10.11	
	1.280	33.30	10.40	43.70	56.00	12.30	
	2.417	20.40	10.43	30.83	56.00	25.17	
	24.040	27.10	10.73	37.83	60.00	22.17	
	0.152	27.90	10.59	38.49	55.88	17.39	AV
	0.292	36.01	10.47	46.48	50.46	3.98	
	0.679	27.00	10.39	37.39	46.00	8.61	
	1.280	22.20	10.40	32.60	46.00	13.40	
	2.417	13.10	10.43	23.53	46.00	22.47	
	24.040	16.30	10.73	27.03	50.00	22.97	
Neutral	0.151	42.50	10.59	53.09	65.96	12.87	QP
	0.291	39.71	10.45	50.16	60.50	10.34	
	0.685	32.60	10.37	42.97	56.00	13.03	
	0.866	33.40	10.38	43.78	56.00	12.22	
	2.448	30.40	10.43	40.83	56.00	15.17	
	23.340	28.51	10.80	39.31	60.00	20.69	
	0.151	30.60	10.59	41.19	55.96	14.77	AV
	0.291	35.81	10.45	46.26	50.50	4.24	
	0.685	21.50	10.37	31.87	46.00	14.13	
	0.866	27.10	10.38	37.48	46.00	8.52	
	2.448	18.50	10.43	28.93	46.00	17.07	
	23.340	18.91	10.80	29.71	50.00	20.29	

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 48%RH

Test Mode : USB Play Date of Test : Jun 23, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.151	40.90	10.59	51.49	65.95	14.46	QP
	0.293	38.71	10.47	49.18	60.43	11.25	
	0.687	32.50	10.39	42.89	56.00	13.11	
	1.294	33.20	10.40	43.60	56.00	12.40	
	2.451	31.81	10.43	42.24	56.00	13.76	
	24.660	23.90	10.75	34.65	60.00	25.35	
	AV	0.151	28.60	10.59	39.19	55.95	16.76
		0.293	34.01	10.47	44.48	50.43	5.95
		0.687	24.40	10.39	34.79	46.00	11.21
		1.294	25.80	10.40	36.20	46.00	9.80
		2.451	21.91	10.43	32.34	46.00	13.66
		24.660	14.80	10.75	25.55	50.00	24.45
Neutral	0.151	41.10	10.59	51.69	65.94	14.25	QP
	0.297	39.30	10.45	49.75	60.32	10.57	
	0.896	33.60	10.38	43.98	56.00	12.02	
	1.294	31.19	10.40	41.59	56.00	14.41	
	2.258	32.60	10.43	43.03	56.00	12.97	
	23.600	27.80	10.81	38.61	60.00	21.39	
	AV	0.151	28.70	10.59	39.29	55.94	16.65
		0.297	36.80	10.45	47.25	50.32	3.07
		0.896	24.90	10.38	35.28	46.00	10.72
		1.294	13.89	10.40	24.29	46.00	21.71
		2.258	21.10	10.43	31.53	46.00	14.47
		23.600	18.30	10.81	29.11	50.00	20.89

TEST ENGINEER: SEVEN LU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 48%RH

Test Mode : LAN Play Date of Test : Jun 23, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.152	39.90	10.59	50.49	65.91	15.42	QP
	0.299	39.00	10.47	49.47	60.27	10.80	
	0.896	33.30	10.39	43.69	56.00	12.31	
	1.493	33.00	10.41	43.41	56.00	12.59	
	3.078	33.20	10.45	43.65	56.00	12.35	
	25.480	23.70	10.78	34.48	60.00	25.52	
	0.152	27.50	10.59	38.09	55.91	17.82	AV
	0.299	36.40	10.47	46.87	50.27	3.40	
	0.896	24.50	10.39	34.89	46.00	11.11	
	1.493	24.50	10.41	34.91	46.00	11.09	
	3.078	21.30	10.45	31.75	46.00	14.25	
	25.480	14.80	10.78	25.58	50.00	24.42	
Neutral	0.151	41.40	10.59	51.99	65.96	13.97	QP
	0.290	34.81	10.45	45.26	60.54	15.28	
	0.687	32.60	10.37	42.97	56.00	13.03	
	1.455	33.40	10.40	43.80	56.00	12.20	
	3.026	34.11	10.44	44.55	56.00	11.45	
	23.350	27.51	10.80	38.31	60.00	21.69	
	0.151	29.30	10.59	39.89	55.96	16.07	AV
	0.290	26.91	10.45	37.36	50.54	13.18	
	0.687	23.70	10.37	34.07	46.00	11.93	
	1.455	24.00	10.40	34.40	46.00	11.60	
	3.026	20.41	10.44	30.85	46.00	15.15	
	23.350	17.71	10.80	28.51	50.00	21.49	

TEST ENGINEER: SEVEN LU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 48%RH

Test Mode : MHL Date of Test : Jun 23, 2016

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark	
Line	0.151	42.30	10.59	52.89	65.95	13.06	QP	
	0.294	39.31	10.47	49.78	60.42	10.64		
	0.881	33.80	10.39	44.19	56.00	11.81		
	1.095	33.00	10.39	43.39	56.00	12.61		
	3.032	34.60	10.45	45.05	56.00	10.95		
	24.330	27.50	10.74	38.24	60.00	21.76		
	0.151	30.00	10.59	40.59	55.95	15.36	AV	
	0.294	36.01	10.47	46.48	50.42	3.94		
	0.881	28.40	10.39	38.79	46.00	7.21		
	1.095	22.50	10.39	32.89	46.00	13.11		
	3.032	23.50	10.45	33.95	46.00	12.05		
	24.330	16.10	10.74	26.84	50.00	23.16		
	Neutral	0.151	42.10	10.59	52.69	65.94	13.25	QP
		0.298	37.90	10.45	48.35	60.31	11.96	
0.882		33.60	10.38	43.98	56.00	12.02		
1.095		33.51	10.38	43.89	56.00	12.11		
3.040		32.01	10.44	42.45	56.00	13.55		
23.530		25.30	10.81	36.11	60.00	23.89		
0.151		30.00	10.59	40.59	55.94	15.35	AV	
0.298		31.00	10.45	41.45	50.31	8.86		
0.882		27.70	10.38	38.08	46.00	7.92		
1.095		26.61	10.38	36.99	46.00	9.01		
3.040		19.91	10.44	30.35	46.00	15.65		
23.530		16.40	10.81	27.21	50.00	22.79		

4 RADIATED EMISSION TEST

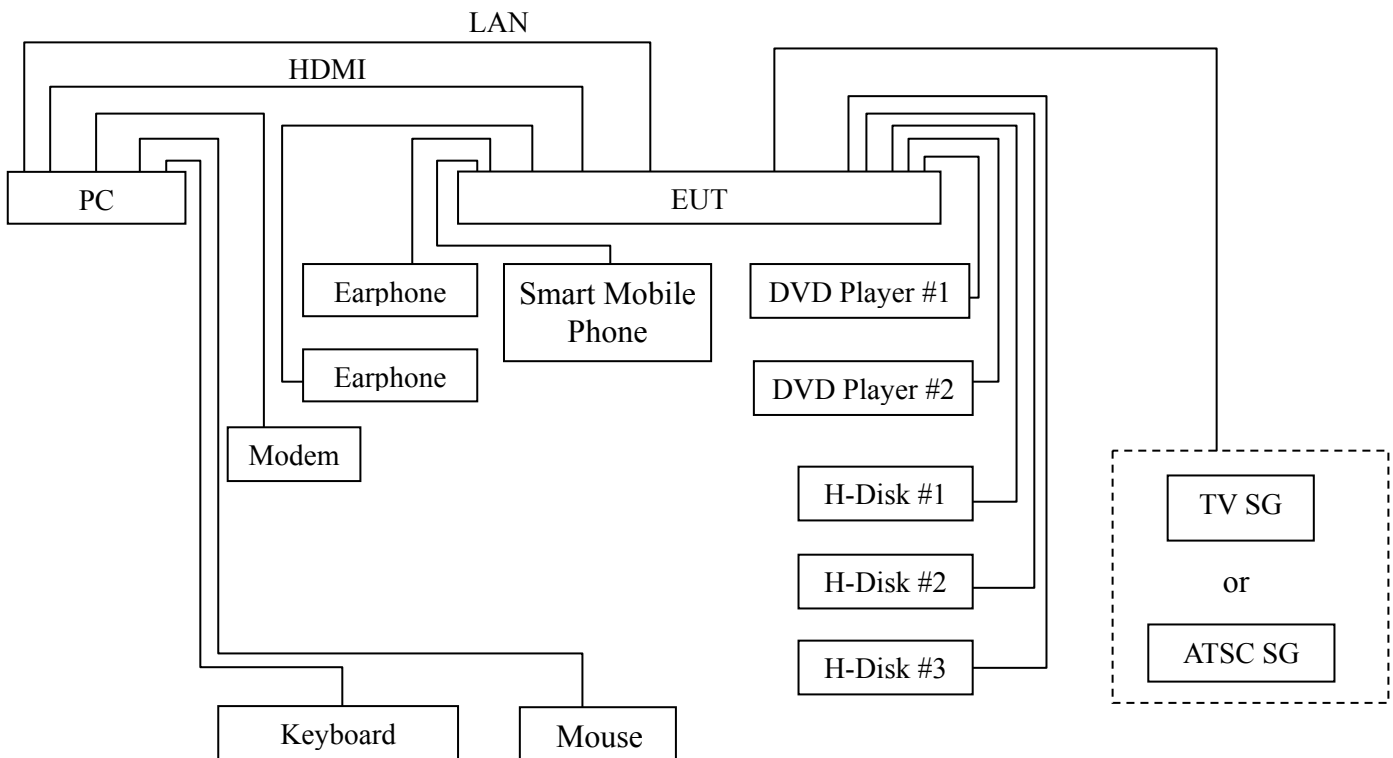
4.1 Test Equipment

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	Mar 19, 2017
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	Apr 26, 2016	Apr 25, 2017
7.	Spectrum	HP	8591EM	3628A00908	May 07, 2016	May 06, 2017
8.	Software	Audix	e3	6.2007-9-10	--	--

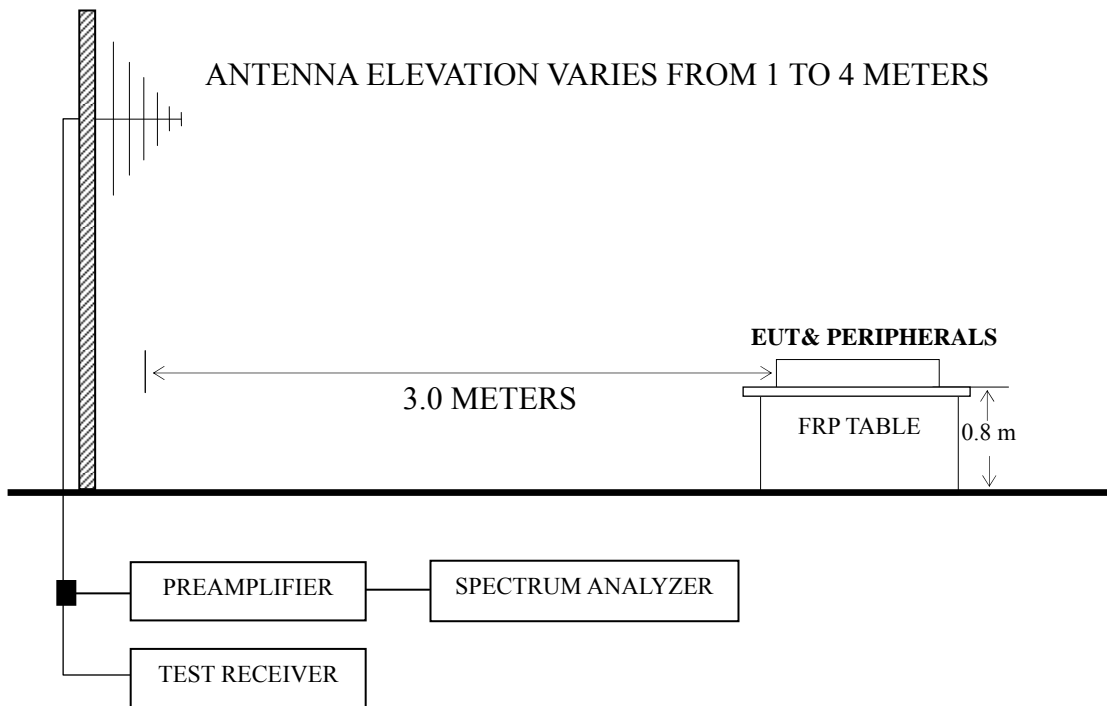
4.2 Block Diagram of Test Setup

4.2.1 EUT & Peripherals

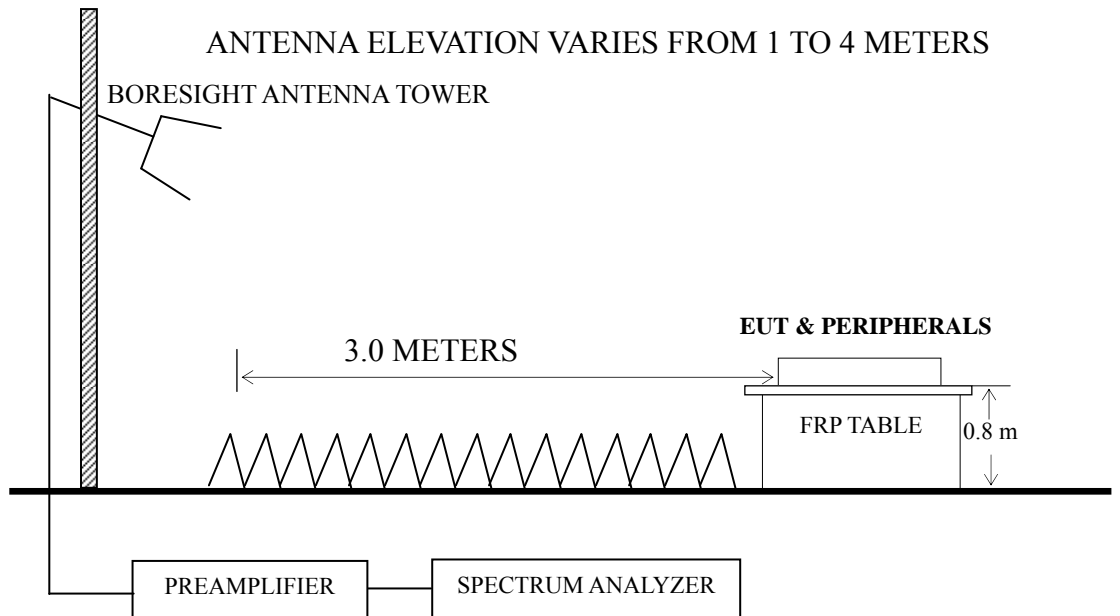


4.2.2 Radiated emission test setup

4.2.2.1 Below 1GHz



4.2.2.2 Above 1GHz



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

Frequency (MHz)	Distance (m)	Field strength limits	
		($\mu\text{V}/\text{m}$)	dB ($\mu\text{V}/\text{m}$)
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 ($\mu\text{V}/\text{m}$) = 20 log Emission Level ($\mu\text{V}/\text{m}$)
 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 6 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 3840*2160@60Hz & 1kHz playing	P26-P27
HDMI 1920*1080@60Hz & 1kHz playing	P28
HDMI 1280*1024@60Hz & 1kHz playing	P29
HDMI 640*480@60Hz & 1kHz playing	P30
HDMI1080P	P31
USB Play	P32
LAN Play	P33
MHL	P34

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 HDMI1080P test mode. The worst emission at horizontal polarization was detected at 82.938 MHz with corrected signal level of 35.11 dB ($\mu\text{V}/\text{m}$) (limit is 40.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 2.00 m height and the turntable was at 70°. The worst emission at vertical polarization was detected at 925.756 MHz with corrected signal level of 42.96 dB ($\mu\text{V}/\text{m}$) (limit is 46.00 dB ($\mu\text{V}/\text{m}$)), when the antenna was 1.50 m height and the turntable was at 300°.

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 60%RH

Test Mode : HDMI 3840*2160@60Hz Date of Test : Jun 27, 2016
& 1kHz Playing

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	
Horizontal	76.244	26.63	8.45	1.02	--	36.10	40.00	3.90	QP	
	86.807	24.90	10.35	1.16	--	36.41	40.00	3.59		
	105.642	26.07	12.26	1.36	--	39.69	43.50	3.81		
	183.844	26.07	10.22	1.87	--	38.16	43.50	5.34		
	796.183	18.70	20.37	3.68	--	42.75	46.00	3.25		
	916.069	17.80	21.43	4.61	--	43.84	46.00	2.16	PK	
	1705.647	61.99	26.45	4.09	35.42	57.11	74.00	16.89		
	2534.314	61.48	28.57	4.96	35.16	59.85	74.00	14.15		
	3375.707	57.73	31.27	6.10	34.83	60.27	74.00	13.73		
	1705.647	40.84	26.45	4.09	35.42	35.96	54.00	18.04		AV
	2534.314	39.74	28.57	4.96	35.16	38.11	54.00	15.89		
	3375.707	36.56	31.27	6.10	34.83	39.10	54.00	14.90		

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 60%RH

Test Mode : HDMI 3840*2160@60Hz & 1kHz Playing Date of Test : Jun 27, 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	30.531	17.67	18.05	0.64	--	36.36	40.00	3.64	QP
	73.876	27.00	8.13	0.99	--	36.12	40.00	3.88	
	89.276	26.26	10.70	1.20	--	38.16	43.50	5.34	
	95.093	26.85	11.66	1.27	--	39.78	43.50	3.72	
	796.183	15.50	20.37	3.68	--	39.55	46.00	6.45	
	919.287	16.72	21.50	4.61	--	42.83	46.00	3.17	PK
	1774.224	61.64	26.70	4.13	35.34	57.13	74.00	16.87	
	2534.314	65.43	28.57	4.96	35.16	63.80	74.00	10.20	
	3399.987	55.12	31.31	6.10	34.81	57.72	74.00	16.28	
	1774.224	40.29	26.70	4.13	35.34	35.78	54.00	18.22	
	AV	2534.314	43.29	28.57	4.96	35.16	41.66	54.00	12.34
		3399.987	33.21	31.31	6.10	34.81	35.81	54.00	18.19

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 60%RH

Test Mode : HDMI 1920*1080@60Hz & 1kHz Playing Date of Test : Jun 27, 2016

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	73.617	26.90	8.07	0.99	35.96	40.00	4.04
	85.898	23.98	10.20	1.16	35.34	40.00	4.66
	106.013	25.33	12.25	1.36	38.94	43.50	4.56
	148.963	25.04	12.16	1.63	38.83	43.50	4.67
	798.980	16.30	20.40	3.68	40.38	46.00	5.62
	922.516	15.05	21.47	4.61	41.13	46.00	4.87
Vertical	30.531	18.15	18.05	0.64	36.84	40.00	3.16
	73.876	27.31	8.13	0.99	36.43	40.00	3.57
	92.787	25.21	11.27	1.24	37.72	43.50	5.78
	99.180	25.64	12.28	1.32	39.24	43.50	4.26
	796.183	14.52	20.37	3.68	38.57	46.00	7.43
	922.516	15.09	21.47	4.61	41.17	46.00	4.83

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 60%RH

Test Mode : HDMI 1280*1024@60Hz & 1kHz Playing Date of Test : Jun 27, 2016

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	73.876	26.88	8.13	0.99	36.00	40.00	4.00
	87.418	23.89	10.45	1.18	35.52	40.00	4.48
	103.442	24.52	12.33	1.34	38.19	43.50	5.31
	109.029	25.11	12.14	1.39	38.64	43.50	4.86
	796.183	16.37	20.37	3.68	40.42	46.00	5.58
	922.516	14.48	21.47	4.61	40.56	46.00	5.44
Vertical	31.071	16.87	17.71	0.65	35.23	40.00	4.77
	72.592	27.02	7.85	0.98	35.85	40.00	4.15
	84.702	24.38	10.01	1.15	35.54	40.00	4.46
	99.878	25.74	12.34	1.32	39.40	43.50	4.10
	801.786	17.19	20.40	3.78	41.37	46.00	4.63
	919.287	14.33	21.50	4.61	40.44	46.00	5.56

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 60%RH

Test Mode : HDMI 640*480@60Hz & 1kHz Playing Date of Test : Jun 27, 2016

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	73.359	26.44	8.02	0.99	35.45	40.00	4.55
	84.999	24.27	10.10	1.15	35.52	40.00	4.48
	89.590	26.27	10.75	1.21	38.23	43.50	5.27
	101.289	25.43	12.37	1.33	39.13	43.50	4.37
	801.786	16.03	20.40	3.78	40.21	46.00	5.79
	925.756	15.64	21.43	4.61	41.68	46.00	4.32
Vertical	30.962	16.67	17.71	0.64	35.02	40.00	4.98
	73.359	26.32	8.02	0.99	35.33	40.00	4.67
	86.200	23.78	10.25	1.16	35.19	40.00	4.81
	94.428	24.99	11.53	1.26	37.78	43.50	5.72
	796.183	15.92	20.37	3.68	39.97	46.00	6.03
	925.756	15.11	21.43	4.61	41.15	46.00	4.85

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C
 Model No. : LC-70N7100U Humidity : 60%RH
 Test Mode : HDMI1080P Date of Test : Jun 27, 2016

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	82.938	24.36	9.63	1.12	35.11	40.00	4.89
	88.342	25.44	10.25	1.20	36.89	43.50	6.61
	96.775	24.31	11.93	1.29	37.53	43.50	5.97
	796.183	16.16	20.57	3.68	40.41	46.00	5.59
	887.610	11.48	21.30	4.46	37.24	46.00	8.76
	925.756	14.33	21.63	4.61	40.57	46.00	5.43
Vertical	86.503	24.25	10.00	1.16	35.41	40.00	4.59
	97.456	25.10	12.02	1.29	38.41	43.50	5.09
	112.131	25.19	12.65	1.41	39.25	43.50	4.25
	121.976	25.79	12.92	1.48	40.19	43.50	3.31
	796.183	16.82	20.57	3.68	41.07	46.00	4.93
	925.756	16.72	21.63	4.61	42.96	46.00	3.04

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 60%RH

Test Mode : USB Play Date of Test : Jun 27, 2016

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	83.816	23.89	9.71	1.13	34.73	40.00	5.27
	91.175	25.30	10.80	1.23	37.33	43.50	6.17
	131.758	22.88	12.73	1.53	37.14	43.50	6.36
	183.844	25.31	10.50	1.87	37.68	43.50	5.82
	793.396	13.97	20.53	3.68	38.18	46.00	7.82
	890.728	14.63	21.30	4.46	40.39	46.00	5.61
Vertical	82.648	23.93	9.60	1.12	34.65	40.00	5.35
	89.590	26.10	10.45	1.21	37.76	43.50	5.74
	96.436	24.63	11.88	1.29	37.80	43.50	5.70
	132.221	24.24	12.71	1.53	38.48	43.50	5.02
	796.183	15.73	20.57	3.68	39.98	46.00	6.02
	919.287	13.70	21.50	4.61	39.81	46.00	6.19

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 60%RH

Test Mode : LAN Play Date of Test : Jun 27, 2016

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	79.243	22.97	9.23	1.07	33.27	40.00	6.73
	86.503	22.66	10.00	1.16	33.82	40.00	6.18
	99.878	23.63	12.25	1.32	37.20	43.50	6.30
	185.138	24.85	10.50	1.88	37.23	43.50	6.27
	801.786	15.86	20.60	3.78	40.24	46.00	5.76
	893.857	12.86	21.30	4.46	38.62	46.00	7.38
Vertical	85.298	23.31	9.85	1.15	34.31	40.00	5.69
	100.934	19.50	12.34	1.33	33.17	43.50	10.33
	121.123	23.25	12.86	1.46	37.57	43.50	5.93
	324.456	22.38	14.63	2.62	39.63	46.00	6.37
	593.050	16.08	18.85	2.31	37.24	46.00	8.76
	796.183	16.09	20.57	3.68	40.34	46.00	5.66

TEST ENGINEER: CAESAR WU

EUT : LED LCD TV Temperature : 22°C

Model No. : LC-70N7100U Humidity : 60%RH

Test Mode : MHL Date of Test : Jun 27, 2016

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	93.768	24.96	11.40	1.26	37.62	43.50	5.88
	112.524	22.81	12.26	1.41	36.48	43.50	7.02
	163.182	22.53	11.19	1.73	35.45	43.50	8.05
	360.448	19.30	15.40	2.67	37.37	46.00	8.63
	530.101	19.70	17.80	2.73	40.23	46.00	5.77
	851.035	10.78	20.57	4.17	35.52	46.00	10.48
Vertical	84.405	24.92	9.74	1.13	35.79	40.00	4.21
	96.436	23.17	11.88	1.29	36.34	43.50	7.16
	116.540	23.50	12.73	1.44	37.67	43.50	5.83
	142.824	21.76	12.25	1.60	35.61	43.50	7.89
	444.851	17.54	16.85	2.82	37.21	46.00	8.79
	739.661	17.91	19.90	3.60	41.41	46.00	4.59

TEST ENGINEER: CAESAR WU

5 DEVIATION TO TEST SPECIFICATIONS

None.

6 DEBUG DESCRIPTION

The following components are used during the countermeasure procedures:

Name	M/N	Manufacturer	Location
SMcontact	SMR-TSL-4-3.5-5R	Qingdao Joinset Co., Ltd	See Internal Photos Figure 25, 26

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:



(BYRON WU)