EMC TEST REPORT

For

15.6” HD LED TV

Prepared for: RADIO PARTS PTY.LTD
562 Spencer Street WEST MELBOURNE, VIC 3003

Prepared By: JUNHAICHENG Technology Co., Ltd.
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Date of Test: Apr. 24, 2017
Date of Report: Apr. 25, 2017
Report Number: JHC170420101E

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TEST REPORT DECLARATION

Applicant	:	RADIO PARTS PTY.LTD
Address	:	562 Spencer Street WEST MELBOURNE, VIC 3003
Manufacturer	:	RADIO PARTS PTY.LTD
Address	:	562 Spencer Street WEST MELBOURNE, VIC 3003
EUT Description	:	15.6” HD LED TV
Trademark	:	*Wintal*
MODEL No	:	15LED17HD

Test Standards:

EN55032: 2015;
EN61000-3-2: 2014;
EN61000-3-3: 2013;
EN55020: 2007 +A11: 2011

The EUT described above is tested by Shenzhen Junhaicheng EMC Laboratory, which ensures the EUT to be compliance with the immunity requirements of the EUT.
The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Tested by:	Jack Liu	Date:	Apr. 24, 2017
	(Jack Liu)		
Checked by:	Frank Mao	Date:	Apr. 24, 2017
	(Frank Mao)		
Approved by:	Leo	Date:	Apr. 25, 2017
	(Leo Qin)		

1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	Test Results
Conducted Disturbance	Pass
Radiated Disturbance	Pass
Disturbance Power	Pass
Harmonic Current	N/A
Voltage Fluctuation and Flicker	Pass
Electrostatic Discharge Immunity	Pass
Radiated Electromagnetic Fields Immunity, keyed carrier	Pass
Electric Fast Transient Burst Immunity	Pass

Remark: “N/A” means “Not applicable.”

2. GENERAL INFORMATION

2.1. Report information

2.1.1.This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that JUNHAICHENG approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that JUNHAICHENG in any way guarantees the later performance of the product/equipment.

2.1.2.The sample/s mentioned in this report is/are supplied by Applicant, JUNHAICHENG therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

2.1.3.Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through JUNHAICHENG, unless the applicant has authorized JUNHAICHENG in writing to do so.

2.2. Measurement Uncertainty

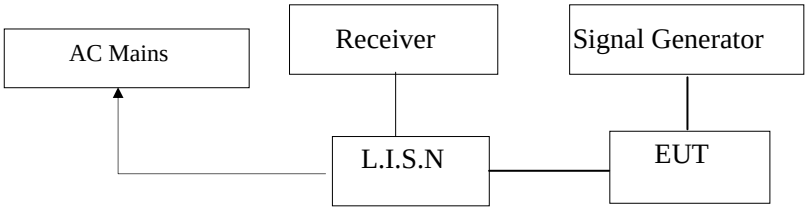
Available upon request.

3. PRODUCT DESCRIPTION

3.1. EUT Description

Description	:	15.6'' HD LED TV
Applicant	:	RADIO PARTS PTY.LTD
Model Number	:	15LED17HD
Input	:	100-240Vac, 50/60Hz, 20W

3.2. Block Diagram of EUT Configuration



3.3. Standard Test Signal for Emission Test

☐ The standard test signal for television receivers and for other equipment with video signal input/output and /or a RF modulator is a standard television color bar signal according to ITU-R BT 471-1 (Figure 1 of standard EN55013). The modulator of the video and the audio signals on the RF carrier shall be according to the system for which the equipment is intended.

In the case of television receivers, the wanted signal shall be a vision carrier modulated by a complete video waveform including a color burst together with an unmodulated sound carrier of the correct relative amplitude and frequency.

The teletext picture shall preferably be the one shown in figure 2 of standard EN55013, consisting of rows of numbers completely filling the screen. If this picture is not available, measurement shall be done with the main index page of the national teletext broadcast service. In the latter case the picture used shall be indicated with the results.

☐ FM receiver: a RF signal frequency modulated with a monophonic signal at 1kHz with 37.5 kHz deviation;

☐ LW/MW/SW: a RF signal amplitude modulated with a signal at 1 kHz with 50% modulation;

☐ Audio amplifiers and infrared headphones: a sinusoidal at 1kHz;

☐ Associated audio equipment e.g. audio tape recorders, record players, CD players: a tape or disc recorded 1kHz audio signal with a standard sound level specified by the manufacturer

or the equipment under test;

☐Associated video equipment, e.g. video tape players, camcorders, laser disc player: a tape or disc recorded standard television color bar signal with 1 kHz audio signal, with a standard sound level specified by the manufacturer of the equipment under test;

☐ Electronic organs: a signal derived from depressing the upper C note (approx. 523Hz);

☐ Infrared remote controls: a permanent transmission of a typical control function.

3.4. Support Equipment List

Table 2 Ancillary Equipment

Name	Model No	S/N	Manufacturer	Cables and Cords	Used "√"
VCD Standard test disc	--	--	China TV and Acoustic Institute	--	
DVD Standard test disc	--	--	A.BEX	--	
Standard test tape	--	--	TDK	--	
Color TV	KV-J21TF8	5057351	SONY	Power line: 1.4m	
Microphone	MA-975	--	MISHA	Signal line: 6m	
Color TV	St-m3440	3300189-04	TCL	Power Line: 1.0	

3.5. Operating Condition of EUT

Test mode 1: ON

3.6. Test Conditions

Temperature: 20-21℃
Relative Humidity: 51-56 %

3.7. Modifications

No modification was made.

3.8. Abbreviations

EUT	Equipment Under Test
FM	Frequency Modulation
AF	Audio Frequency
N/A	Not Applicable
CD	Compact Disc
DVD	Digital Video Disc
VCD	Video Compact Disc
EMC	Electromagnetic Compatibility
AM	Amplitude Modulation
AC/DC	Alternate Current/Direct Current
LW, MW and SW	Long Wave, Medium Wave and Short Wave
RF	Radio Frequency
TV	Color Television
e.m.f.	Electro-motive-force
EMI	Electromagnetic Interference
EMS	Electromagnetic Susceptibility

3.9. Performance Criterion

Criterion A: The equipment shall continue to operate as intended during test. No change of actual operating state (for example change of channel) is allowed as a result of the application of the test. Multifunction equipment shall for each function meet the relevant requirements. Evaluation is carried out for audio and video functions. The equipment is supposed to operate as intended if the criteria of 4.1.1.1 and/or 4.1.1.2 of standard EN55020 are fulfilled.

Criterion B: The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

4. TEST EQUIPMENT USED

4.1. Test Equipment Used to Measure Conducted Disturbance

Table 3 Conducted Disturbance Test Equipment

No.	Equipment	Manufacturer	Model No.	Cal. Interval
SB2603	EMI Test Receiver	Rohde & Schwarz	ESCS30	1 Year
SB3321	AMN	Rohde & Schwarz	ESH3-Z5	1 Year

4.2. Test Equipment Used to Measure Radiated Disturbance

Table 4 Radiated Disturbance Test Equipment

No.	Equipment	Manufacturer	Model No.	Cal. Interval
SB3436	EMI Test Receiver	Rohde & Schwarz	ESI26	1 Year
SB3440	Bilog Antenna	Chase	CBL6112B	1 Year

4.3. Test Equipment Used to Disturbance Power

Table 5 Disturbance Power Test Equipment

No.	Equipment	Manufacturer	Model No.	Cal. Interval
SB2603	EMI Test Receiver	Rohde & Schwarz	ESCS30	1 Year
SB2602	Absorbing Clamp	Rohde & Schwarz	MDS-21	1 Year

4.4. Test Equipment Used to Measure Harmonic Current /Voltage Fluctuation and Flicker

Table 6 Harmonic Current /Voltage Fluctuation and Flicker Test Equipment

No.	Equipment	Manufacturer	Model No.	Cal. Interval
SB2588	Harmonic flicker test system	CI	5001ix-CTS-400	1 Year
SB2588/01	Three Phase Harmonic flicker test system	CI	PACS-3	1 Year
SB2588/02	Power	CI	5001ix-CTS-400-NO	1 Year
SB2588/03	Power	CI	5001ix-CTS-400-NO	1 Year

4.5. Test Equipment Used to Measure Electrostatic Discharge Immunity

Table 7 ESD Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	Cal. Interval
SB2561	ESD tester	SCHNAFFNER	NSG435	1 Year

4.6. Test Equipment Used to Measure RF Electromagnetic Fields Immunity, Keyed Carrier

Table 8 Radiated Electromagnetic Field Immunity, keyed carrier Test Equipment

No.	Equipment	Manufacturer	Model No.	Cal. Interval
SB3433	Signal Generator	Rohde & Schwarz	SMT03	1 Year
SB3437/02	Voltage Probe	Rohde & Schwarz	URV5-Z2	1 Year
SB3173	Power Amplifier	AR	150W1000	1 Year
SB2622	Bilog Antenna	Chase	CBL6111C	1 Year

4.7. Test Equipment Used to Measure Electrical Fast Transients/Bursts Immunity

Table 9 EFT Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	Cal. Interval
SB2556	EFT simulator	SCHNAFFNER	NSG2025-1	1 Year
SB2585	AM/FM generator	Jung Jin	JSG-1101B	1 Year
SB3612	Audio generator	KENWOOD	AD-203D	1 Year

5. CONDUCTED DISTURBANCE TEST

5.1. Test Standard and Limit

5.1.1.Test Standard

EN55032: 2015

5.1.2.Test Limit

Table 10 Conducted Disturbance Test Limit

Frequency	Maximum RF Line Voltage (dBμV)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

* Decreasing linearly with logarithm of the frequency

5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver is used to test the emissions form both sides of AC line. The bandwidth of EMI test receiver is set at 9kHz.

5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

5.4. Test Data

The emissions don’t show in below are too low against the limits, the test data and curves are shown in the APPENDIX Ⅰ

6. RADIATED DISTURBANCE TEST

6.1. Test Standard and Limit

6.1.1.Test Standard

EN55032: 2015

6.1.2.Test Limit

Table 11 Radiated Disturbance Test Limit

Equipment Type	Source	Frequency MHz	Limit Values dB(μV/m) Quasi-peak
Television receivers, video recorders and PC tuner cards	Local oscillator	≤1000	Fundamental 57 Harmonics 52
	Other	30 to 300 300 to 1000 30 to 230 230 to 1000	Harmonics 56 4 0 4 7
Television and sound receivers for broadcast satellite transmissions (except outdoor units), Infrared remote control units and Infrared headphone systems	other	30 to 230 230 to 1000	4 0 4 7
Frequency modulation sound receivers and PC tuner cards	Local oscillator	≤1000	Fundamental 60
	Other	30 to 300 300 to 1000 30 to 230 230 to 1000	Harmonics 52 Harmonics 56 40 47

* The lower limit shall apply at the transition frequency.

* The test distance is 3m.

6.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set **3 meters** away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

6.4. Test Data

For the test data and test curves, refer to the appendix I.

7. HARMONIC CURRENT EMISSION TEST

7.1. Test Standard and Limit

7.1.1.Test Standard

EN61000-3-2: 2014

7.1.2.Limits

Table 13 Harmonic Current Test Limit (Class A)

Harmonic order (**n**)	Maximum permissible harmonic current (A)
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15≤n≤39	0.15×15/**n**
Even harmonics	
2	1.08
4	0.43
6	0.30
8≤n≤40	0.23×8/**n**

7.2. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the Power of the EUT and use the test system to test the harmonic current level.

7.3. Test result

The active input power of this EUT is less than 75W. Therefore, according to EN 61000-3-2, no limits are necessary.

8. VOLTAGE FLUCTUATION AND FLICKER TEST

8.1. Test Standard and Limit

8.1.1.Test Standard

EN61000-3-3: 2013

8.1.2.Limit

Table 14 Flicker Test Limit

Test items	Limits
Pst	1.0
dc	3.3%
dmax	4.0%
dt	Not exceed 3.3% for 500ms

8.2. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

8.3. Test Data

Table 15 Flicker test Data

Model No.: 15LED17HD Test Mode: 1		
Items	Reading	Limit
dmax	0.00	4.0%
dc	0.00	3.3%
dt	0.00	Not exceed 3.3% for 500ms
Pst	0.001	1.0

9. ELECTROSTATIC DISCHARGE IMMUNITY

9.1. Test Requirements

9.1.1.Test Standard

EN55020:2007+A11: 2011 (EN61000-4-2: 2009)

9.1.2.Test Level

Table 16 Test Level for ESD

Port	Test Specification
Enclosure Port	8kV air discharge 4kV contact discharge

9.1.3.Performance criterion**: B**

9.2. Test Procedure

9.2.1.Contact Discharge**:**

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tips of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

9.2.2.Air Discharge**:**

Air discharge is used where contact discharge can't be applied.. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

9.2.3.Indirect discharge for coupling plane

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

9.3. Test Data

Table 17 ESD Test Data

Model No.: 15LED17HD Test Mode: 1				
Location	Voltage	Amount of test points	Discharge Method	Results
Enclosure	±8Kv	15	A	Pass
Single terminals	±4kV	13	C	Pass
Screw	±4kV	13	C	Pass
HCP	±4kV	10	C	Pass
VCP	±4kV	10	C	Pass

10. RADIATED ELECTROMAGNETIC FIELD IMMUNITY, KEYED CARRIER

10.1.Test Requirements

10.1.1.Test Standard

EN55020:2007+A11: 2011 (EN61000-4-3:2006+ A1: 2008 +A2: 2010)
Test Level

Table 18 Test Level for Radiated Electromagnetic Field Immunity Test

Port	Test Specification
Enclosure Port	900MHz, 3 V/m, duty cycle 1/8, 217Hz repetition frequency

10.1.2.Performance criterion**: A**

10.2.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter above ground. EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set during test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, an audio analyzer and/or TV is used to monitor EUT.

10.3.Test Data

Table 19 Radiated Electromagnetic Field Immunity, Keyed Carrier Test Data

Model No: 15LED17HD Test Mode: 1	
Frequency Range (MHz)	900MHz
Field Strength (V/m)	3V/m
Polarized	Vertical
Left	Pass
Right	Pass

11. ELECTRICAL FAST TRANSIENTS/BURSTS

11.1.Test Requirements

11.1.1.Test Standard

EN55020: 2007+A11: 2011 (EN61000-4-4: 2012)

11.1.2.Level

Table 20 Test Level for EFT

Port	Test Specification
AC Power input	1kV (peak) 5/50 ns Tr/Th 5kHz repetition frequency

11.1.3.Performance criterion**: B**

11.2.Test Procedure

11.2.1.For AC mains power ports**:**

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1minute.

11.2.2.For signal lines and control lines ports**:**

A coupling clamp is use to couple the EFT interference signal to the signal and control lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 minute.

11.2.3.For DC input and DC output power ports**:**

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 minute.

11.3.Test Data

Table 21 EFT Test Data

Model No: 15LED17HD Test Mode: 1				
Injected Line	Voltage (kV)	Test Time (s)	Injected Method	Result
L	+1	60	Direct	Pass
	-1	60	Direct	Pass
N	+1	60	Direct	Pass
	-1	60	Direct	Pass
L,N	+1	60	Direct	Pass
	-1	60	Direct	Pass

12. TABLE LIST

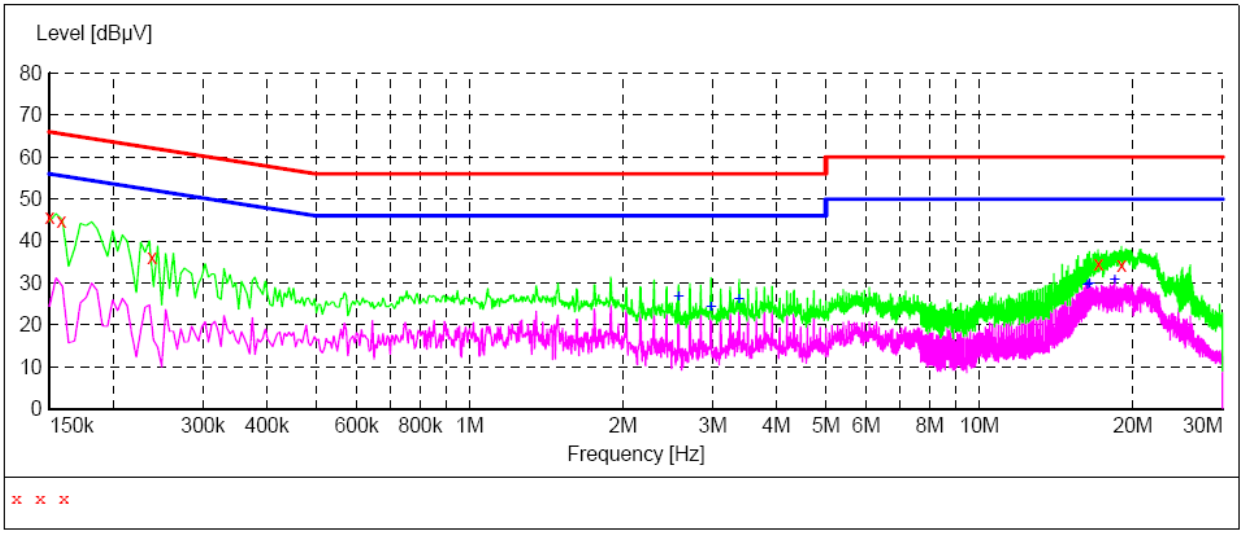
APPENDIX I TEST CURVES

Voltage Mains Test EN 55032

EUT: 15.6'' HD LED TV
Manufacturer: RADIO
Operating Condition: ON
Test Site: /
Operator: WZ
Test Specification: AC 230V/50Hz
Comment:

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	45.60	10.2	66	20.4	QP	N	GND
0.158000	44.80	10.2	66	20.8	QP	N	GND
0.238000	36.20	10.2	62	26.0	QP	N	GND
17.108000	34.50	10.8	60	25.5	QP	N	GND
18.998000	34.30	10.9	60	25.7	QP	N	GND

MEASUREMENT RESULT: "CTL170316408_fin2"

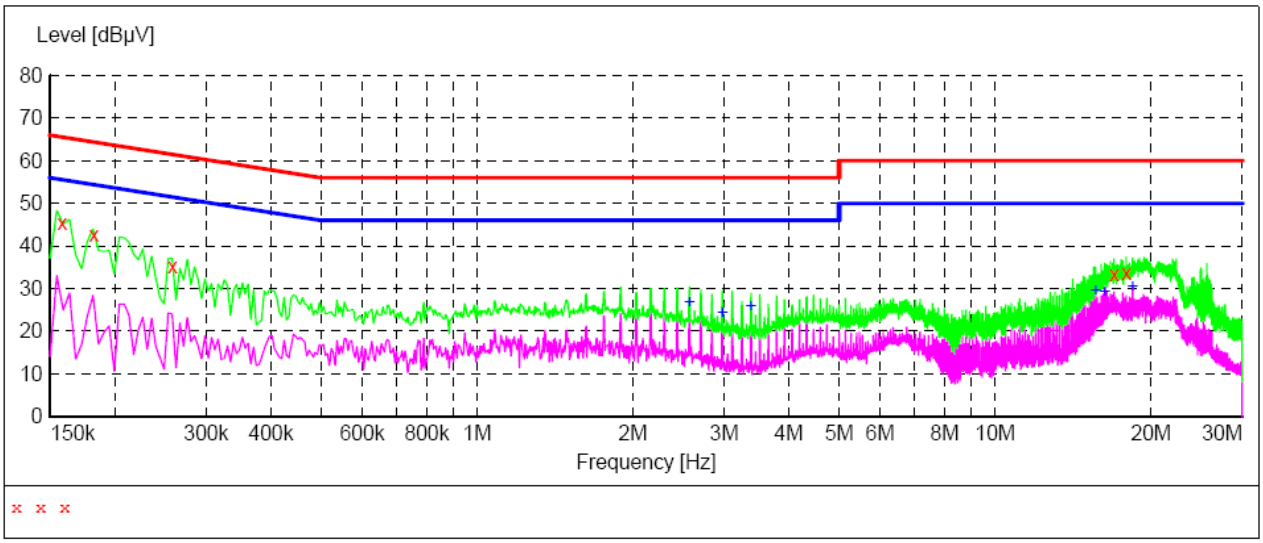
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
2.570000	26.90	10.4	46	19.1	AV	N	GND
2.978000	24.50	10.4	46	21.5	AV	N	GND
3.380000	26.10	10.4	46	19.9	AV	N	GND
16.298000	29.70	10.7	50	20.3	AV	N	GND
16.430000	30.00	10.8	50	20.0	AV	N	GND
18.434000	30.90	10.9	50	19.1	AV	N	GND

Voltage Mains Test EN 55032

EUT: 15.6'' HD LED TV
Manufacturer: RADIO
Operating Condition: ON
Test Site: /
Operator: WZ
Test Specification: AC 230V/50Hz
Comment:

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



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MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	45.30	10.2	66	20.3	QP	L1	GND
0.182000	42.50	10.2	64	21.9	QP	L1	GND
0.258000	35.10	10.2	62	26.4	QP	L1	GND
16.970000	33.30	10.8	60	26.7	QP	L1	GND
17.918000	33.80	10.8	60	26.2	QP	L1	GND

MEASUREMENT RESULT:

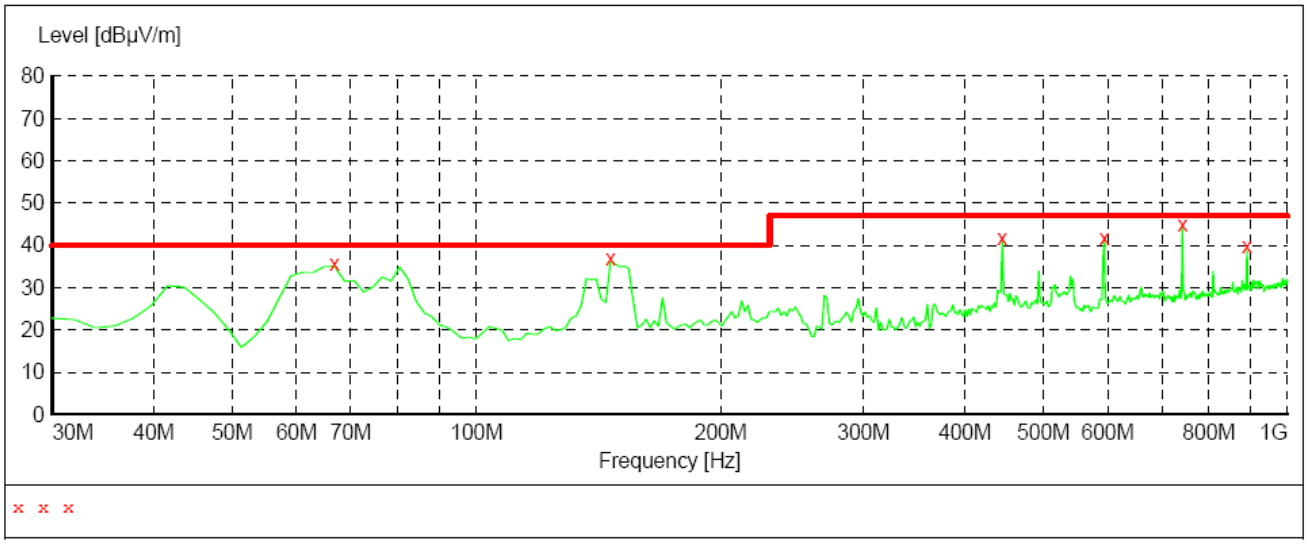
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
2.570000	26.80	10.4	46	19.2	AV	L1	GND
2.978000	24.30	10.4	46	21.7	AV	L1	GND
3.380000	25.80	10.4	46	20.2	AV	L1	GND
15.620000	29.60	10.7	50	20.4	AV	L1	GND
16.298000	29.30	10.7	50	20.7	AV	L1	GND
18.434000	30.40	10.9	50	19.6	AV	L1	GND

Radiation Emission Test EN 55032

EUT: 15.6'' HD LED TV
Manufacturer: RADIO
Operating Condition: ON
Test Site: 3m Chamber
Operator: XIANG
Test Specification: AC 230V/50Hz
Comment:

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
66.860000	34.90	8.2	40.0	5.1	---	0.0	0.00	VERTICAL
146.400000	36.10	14.0	40.0	3.9	---	0.0	0.00	VERTICAL
445.160000	40.90	19.0	47.0	6.1	---	0.0	0.00	VERTICAL
594.540000	40.90	21.7	47.0	6.1	---	0.0	0.00	VERTICAL
741.980000	44.20	24.0	47.0	2.8	---	0.0	0.00	VERTICAL
891.360000	39.00	25.8	47.0	8.0	---	0.0	0.00	VERTICAL

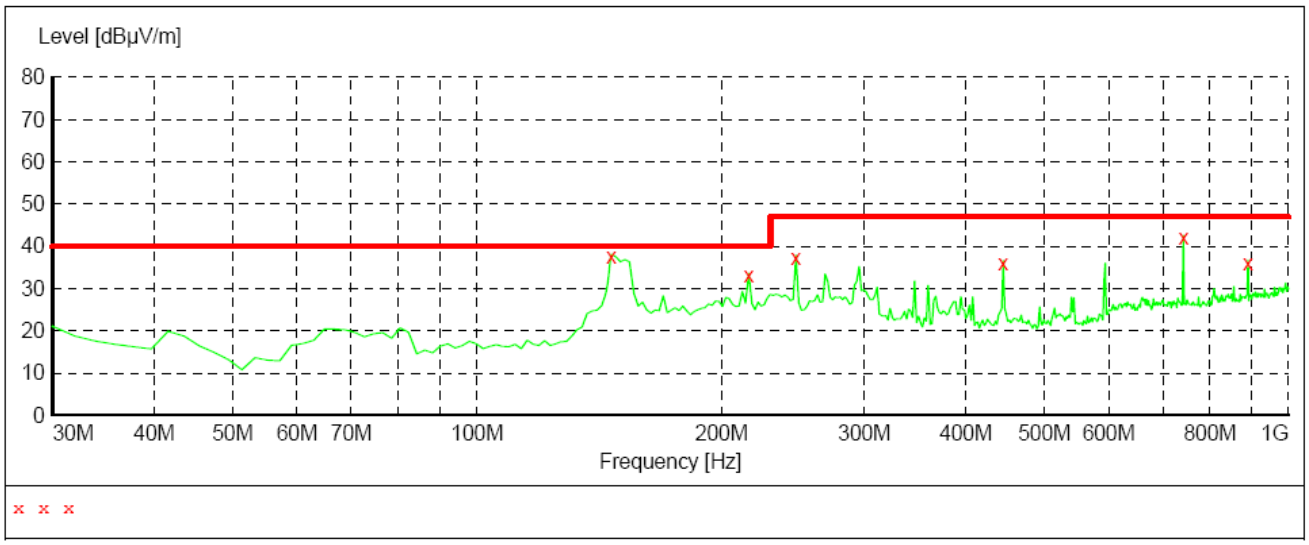
Radiation Emission Test EN 55032

EUT: 15.6'' HD LED TV
Manufacturer: RADIO
Operating Condition: ON
Test Site: 3m Chamber
Operator: XIANG
Test Specification: AC 230V/50Hz
Comment:

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
146.400000	37.60	14.0	40.0	2.4	---	0.0	0.00	HORIZONTAL
216.240000	34.40	14.0	40.0	5.6	---	0.0	0.00	HORIZONTAL
247.280000	38.70	13.8	47.0	8.3	---	0.0	0.00	HORIZONTAL
445.160000	37.40	19.0	47.0	9.6	---	0.0	0.00	HORIZONTAL
741.980000	43.40	24.0	47.0	3.6	---	0.0	0.00	HORIZONTAL
891.360000	37.50	25.8	47.0	9.5	---	0.0	0.00	HORIZONTAL

APPENDIX II TEST PICTURE

Photo 1 Conducted Disturbance Test

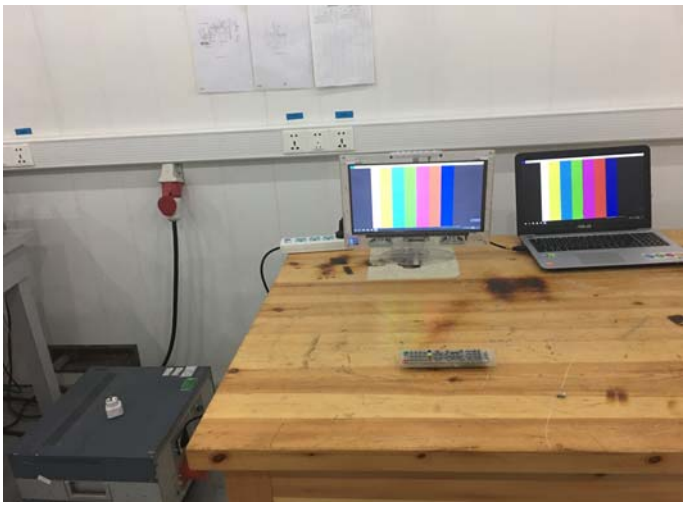


Photo 2 Radiation disturbance test

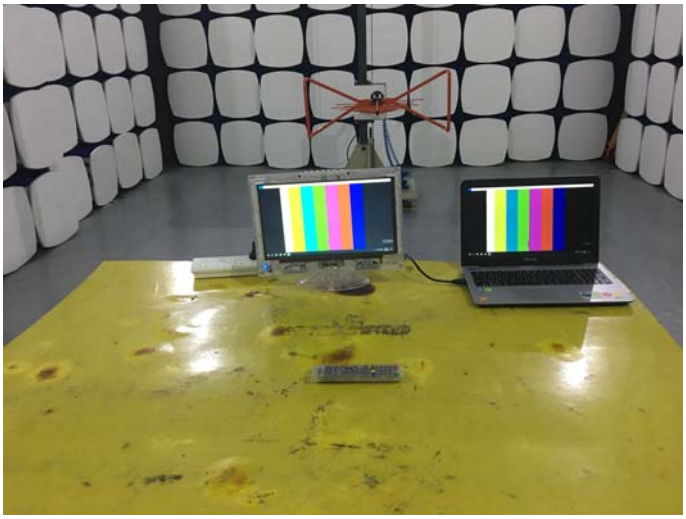


Photo 3 ESD test

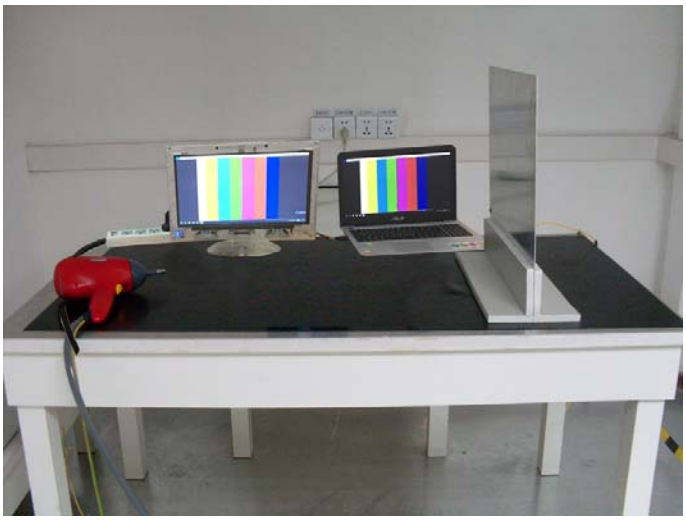


Photo 4 overall view

Photo 5 rear view

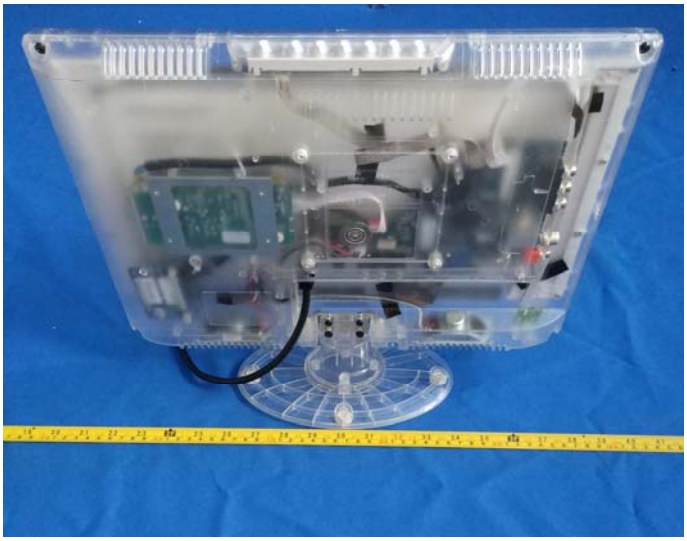


Photo 6 inside view

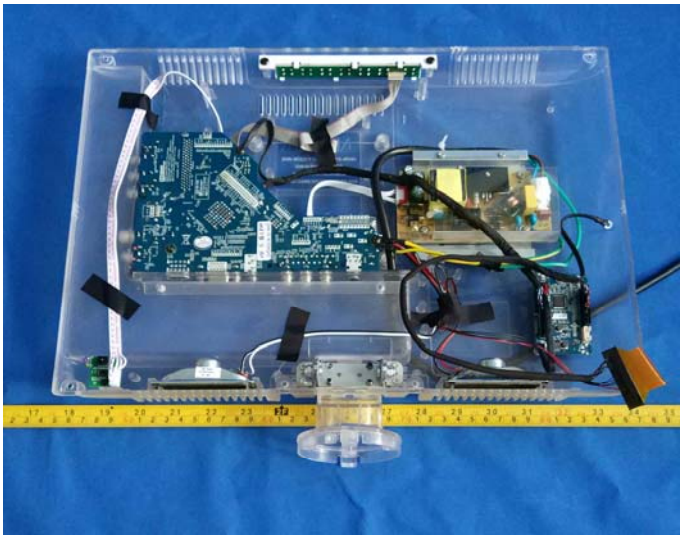


Photo 7 inside view

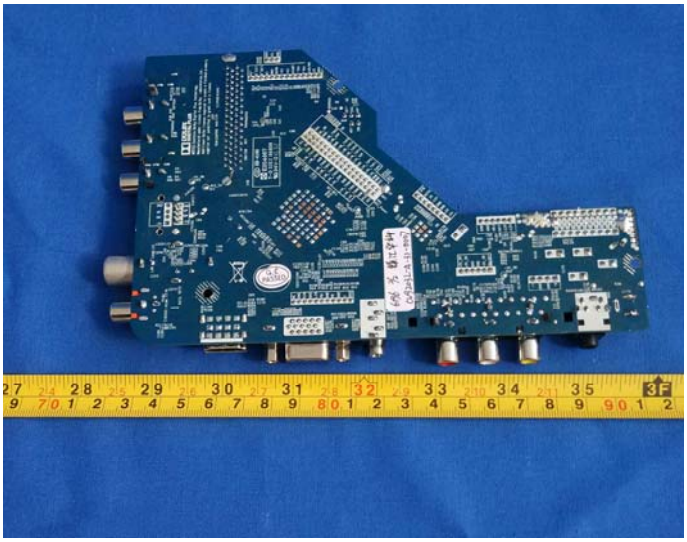


Photo 8 inside view

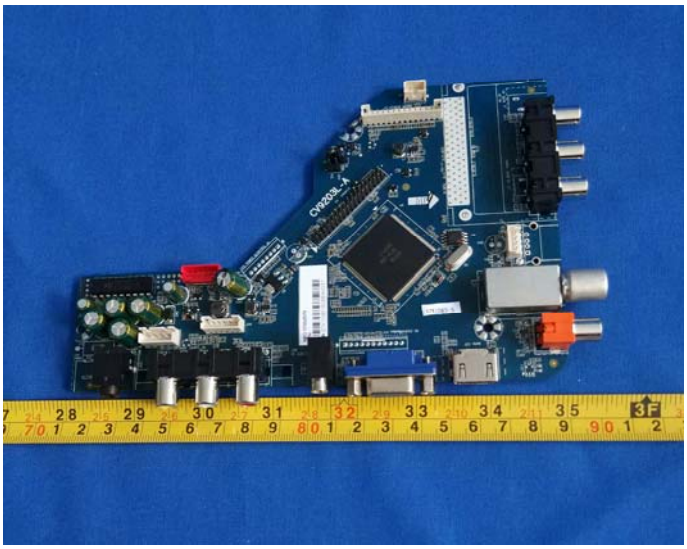


Photo 9 inside view

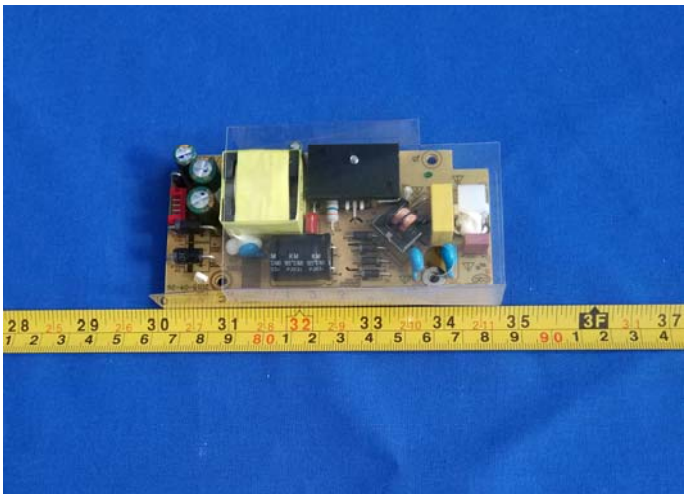


Photo 10 inside view