

# FCC REPORT

**Applicant:** Lightcomm Technology Co., Ltd.

**Address of Applicant:** Rooms M207-8, Haleson Building, 1 Jubilee Street, Central, Hong Kong

**Equipment Under Test (EUT)**

Product Name: Roof mount monitor with DVD

Model No.: F1301-J, AVXMTG13UA, F1301A-J

**FCC ID:** XMF-F1301-J

**Standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.239:2012

**Date of Receipt:** May 07, 2013

**Date of Test:** May 07-10, 2013

**Date of Issue:** May 13, 2013

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

A circular blue stamp with the text "GLOBAL UNITED TECHNOLOGY SERVICES CO., LTD." around the perimeter and "GTS GLOBAL TESTING" in the center. A handwritten signature in black ink is written over the stamp.

Robinson Lo  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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## 2 Version

Version No.	Date	Description
00	May 13, 2013	Original

**Prepared By:**

*hank. yan.*

**Date:**

May 13, 2013

Project Engineer

**Check By:**

*Hans. Hu*

**Date:**

May 13, 2013

Reviewer

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	PASS
Field strength of the fundamental signal	15.239 (a)	PASS
Spurious emissions	15.239 (c)/15.209	PASS
20dB Bandwidth	15.215 (c)/15.239 (a)	PASS

*Remark:*

*Pass: The EUT complies with the essential requirements in the standard.*

## 5 General Information

### 5.1 Client Information

Applicant:	Lightcomm Technology Co., Ltd.
Address of Applicant:	Rooms M207-8, Haleson Building, 1 Jubilee Street, Central, Hong Kong
Manufacturer/Factory:	Huizhou Hengdu Electronics Co., Ltd.
Address of Manufacturer/Factory:	DIP South Area, Huiao Highway, Huizhou, Guangdong, China

### 5.2 General Description of EUT

Product Name:	Roof mount monitor with DVD
Model No.:	F1301-J, AVXMTG13UA, F1301A-J
Test Model No.:	F1301-J
Remark:	<i>F1301-J, AVXMTG13UA and F1301A-J are identical in the same PCB layout, interior structure and electrical circuits. The only difference is the model name for commercial purpose.</i>
Operation Frequency:	88.1MHz-91.1MHz
Channel separation:	200KHz
Modulation type:	FM
Antenna Type:	Integral
Antenna Gain	0.5dBi
Power supply:	DC: 12.0V

Note:

In section 15.31(m), regards to the operating frequency range less than 10 MHz, the Lowest frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	88.1MHz
The Highest channel	91.1MHz

### 5.3 Test mode

Transmitting mode:	Pre-scan input 20Hz-20KHz audio signal to the EUT, and found 1KHz audio signal which it is worse case.
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### 5.4 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"><li>● CNAS —Registration No.: CNAS L5775 CNAS has accredited Global United Technology Services Co., Ltd. to ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.</li><li>● FCC —Registration No.: 600491 Global United Technology Service Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 600491, July 20, 2010.</li><li>● Industry Canada (IC) The 3m Semi-anechoic chamber of Global United Technology Service Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.</li></ul>
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### 5.5 Test Location

All tests were performed at:
Global United Technology Service Co., Ltd. Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China Tel: 0755-27798480 Fax: 0755-27798960

### 5.6 Other Information Requested by the Customer

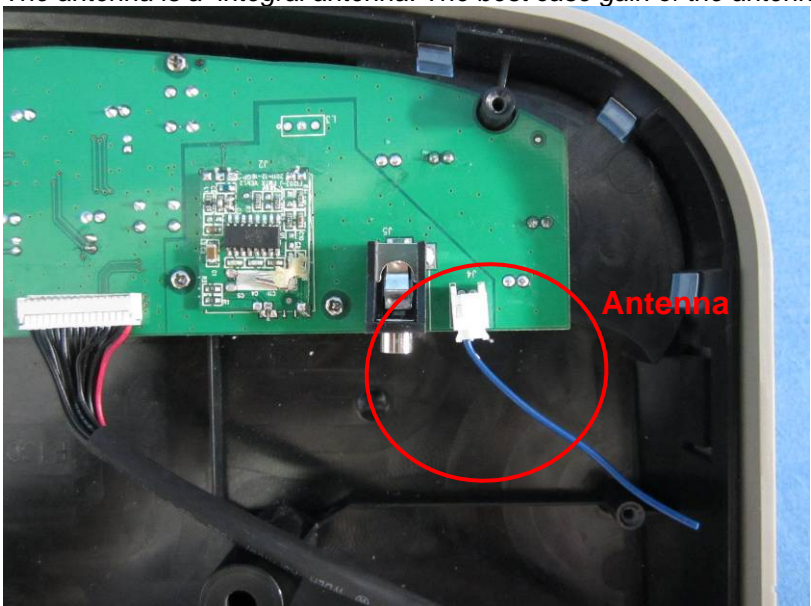
None.
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## 5.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 29 2013	Mar. 28 2015
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 03 2012	Jul. 02 2013
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 24 2013	Feb. 23 2014
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2012	June 28 2013
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 29 2013	Mar. 28 2014
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Mar. 30 2013	Mar. 29 2014
9	Coaxial Cable	GTS	N/A	GTS211	Mar. 30 2013	Mar. 29 2014
10	Coaxial cable	GTS	N/A	GTS210	Mar. 30 2013	Mar. 29 2014
11	Coaxial Cable	GTS	N/A	GTS212	Mar. 30 2013	Mar. 29 2014
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 03 2012	Jul. 02 2013
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 03 2012	Jul. 02 2013
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2012	June 28 2013
15	Band filter	Amindeon	82346	GTS219	Mar. 30 2013	Mar. 29 2014

## 6 Test results and Measurement Data

### 6.1 Antenna requirement:

<b>Standard requirement:</b>	FCC Part15 C Section 15.203
<p>15.203 requirement:  <i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i></p>	
<b>E.U.T Antenna:</b>	
<p>The antenna is a integral antenna. The best case gain of the antenna is 0.5dBi.</p> 	



## 6.2 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.239 and 15.209																
Test Method:	ANSI C63.4: 2003																
Test Frequency Range:	30MHz to 1100MHz																
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																
Receiver setup: (Spurious Emissions)	Frequency	Detector	RBW	VBW	Remark												
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value												
	Above 1GHz	Peak	1MHz	3MHz	Peak Value												
		Peak	1MHz	10Hz	Average Value												
Receiver setup: (Field strength of the fundamental signal)	Detector	RBW	VBW	Remark													
	Peak	200kHz	300kHz	Peak Value													
	AV	200kHz	300kHz	Average Value													
Limit: (Field strength of the fundamental signal)	Frequency		Limit (dBuV/m @3m)		Remark												
	88.1MHz-107.9MHz		48.0		Average Value												
			68.0		Peak Value												
Limit: (Spurious Emissions)	Frequency		Limit (dBuV/m @3m)		Remark												
	30MHz-88MHz		40.0		Quasi-peak Value												
	88MHz-216MHz		43.5		Quasi-peak Value												
	216MHz-960MHz		46.0		Quasi-peak Value												
	960MHz-1GHz		54.0		Quasi-peak Value												
	Above 1GHz		54.0		Average Value												
74.0			Peak Value														
Test Procedure:	<p>1&gt;. The E.U.T and its simulators are placed on a turn table which is 0.8meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.</p> <p>2&gt;. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.</p> <p>3&gt;. Has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4">Pre-Test Mode: frequency=88.1MHz</th> </tr> <tr> <th>Axis</th> <th>X</th> <th>Y</th> <th>Z</th> </tr> <tr> <td>Field Strength(dBuV/m)</td> <td>56.69</td> <td>50.83</td> <td>52.47</td> </tr> </table> <p>Final Test Mode: According to ANSI C63.4 standards, the test results are both the "worst case" and "worst setup"</p> <p>X axis</p>					Pre-Test Mode: frequency=88.1MHz				Axis	X	Y	Z	Field Strength(dBuV/m)	56.69	50.83	52.47
Pre-Test Mode: frequency=88.1MHz																	
Axis	X	Y	Z														
Field Strength(dBuV/m)	56.69	50.83	52.47														

Test setup:	<p><b>Below 1GHz</b></p> <p><b>Above 1GHz</b></p>
	<p>Test Instruments: Refer to section 5.7 for details</p> <p>Test mode: Refer to section 5.3 for details</p> <p>Test results: Pass</p>

**Note:**

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

## 6.2.1 Measurement Data

### 6.2.1.1 Field Strength Of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
88.10	72.73	14.60	1.09	31.73	56.69	68.00	-11.31	Horizontal
88.10	65.70	14.60	1.09	31.73	49.66	68.00	-18.34	Vertical
91.10	70.51	15.47	1.12	31.72	55.38	68.00	-12.62	Horizontal
91.10	64.60	15.47	1.12	31.72	49.47	68.00	-18.53	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
88.10	61.54	14.60	1.09	31.73	45.50	48.00	-2.50	Horizontal
88.10	54.38	14.60	1.09	31.73	38.34	48.00	-9.66	Vertical
91.10	59.79	15.47	1.12	31.72	44.66	48.00	-3.34	Horizontal
91.10	52.83	15.47	1.12	31.72	37.70	48.00	-10.30	Vertical

## 6.2.1.2 Spurious Emissions

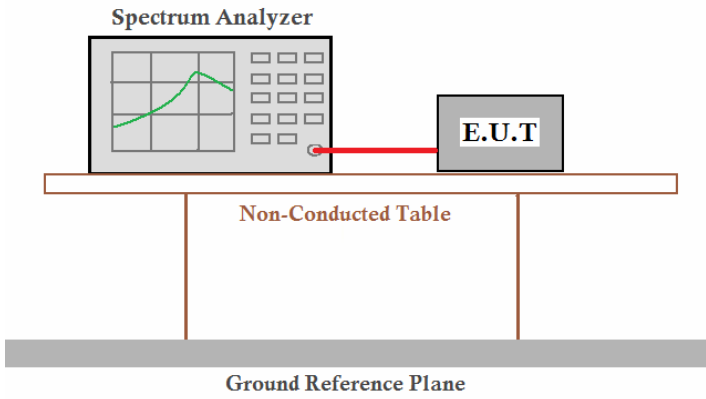
Test mode:	Transmitting	Test channel:	Lowest
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
176.20	57.02	12.55	1.72	32.07	39.22	43.50	-4.28	Horizontal
264.30	56.79	15.26	2.19	32.17	42.07	46.00	-3.93	Horizontal
352.40	53.37	16.35	2.64	32.02	40.34	46.00	-5.66	Horizontal
440.50	50.34	17.56	3.05	31.75	39.20	46.00	-6.80	Horizontal
528.60	36.29	19.20	3.43	31.41	27.51	46.00	-18.49	Horizontal
176.20	54.55	12.55	1.72	32.07	36.75	43.50	-6.75	Vertical
264.30	54.90	15.26	2.19	32.17	40.18	46.00	-5.82	Vertical
352.40	51.18	16.35	2.64	32.02	38.15	46.00	-7.85	Vertical
440.50	49.53	17.56	3.05	31.75	38.39	46.00	-7.61	Vertical
528.60	35.70	19.20	3.43	31.41	26.92	46.00	-19.08	Vertical

Test mode:	Transmitting	Test channel:	Highest
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
182.20	56.00	12.94	1.75	32.09	38.60	43.50	-4.90	Horizontal
273.30	53.67	15.50	2.24	32.17	39.24	46.00	-6.76	Horizontal
364.40	53.62	16.46	2.69	31.99	40.78	46.00	-5.22	Horizontal
455.50	46.75	17.58	3.11	31.70	35.74	46.00	-10.26	Horizontal
546.60	44.00	19.54	3.51	31.30	35.75	46.00	-10.25	Horizontal
182.20	51.34	12.94	1.75	32.09	33.94	43.50	-9.56	Vertical
273.30	53.75	15.50	2.24	32.17	39.32	46.00	-6.68	Vertical
364.40	49.36	16.46	2.69	31.99	36.52	46.00	-9.48	Vertical
455.50	51.63	17.58	3.11	31.70	40.62	46.00	-5.38	Vertical
546.60	39.78	19.54	3.51	31.30	31.53	46.00	-14.47	Vertical

## 6.3 20dB Bandwidth

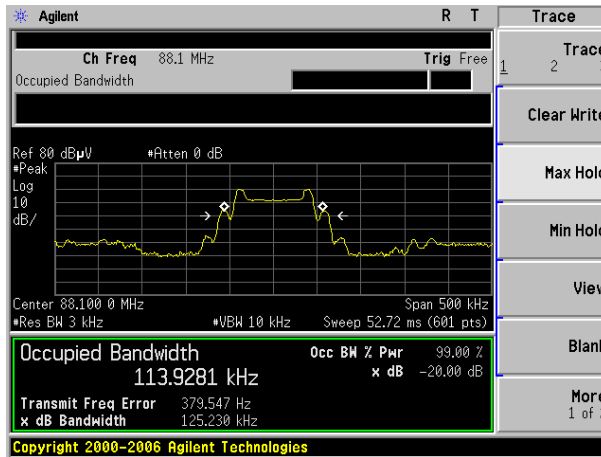
Test Requirement:	FCC Part15 C Section 15.239 (a)
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=1KHz, VBW=3KHz, detector: Peak
Limit:	Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.
Test Procedure:	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set the EUT to proper test channel.</li> <li>3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points.</li> <li>4. Read the frequency delta value between the -20dB upper and lower frequency points.</li> </ol>
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

### Measurement Data

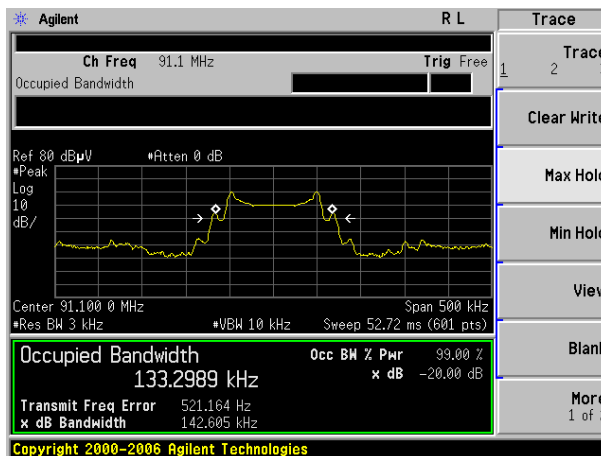
Test channel	Frequency (MHz)	20dB bandwidth(KHz)	Limit(KHz)
Lowest	88.1	125.23	200
Highest	91.1	142.61	200

### Test plot as follows:

Test channel:	Lowest	
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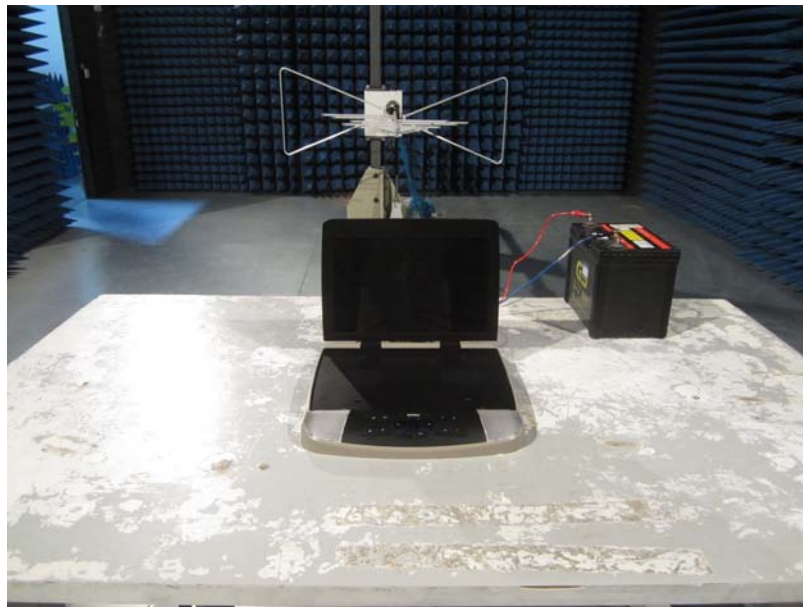


Test channel:	Highest	
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## 7 Test Setup Photo

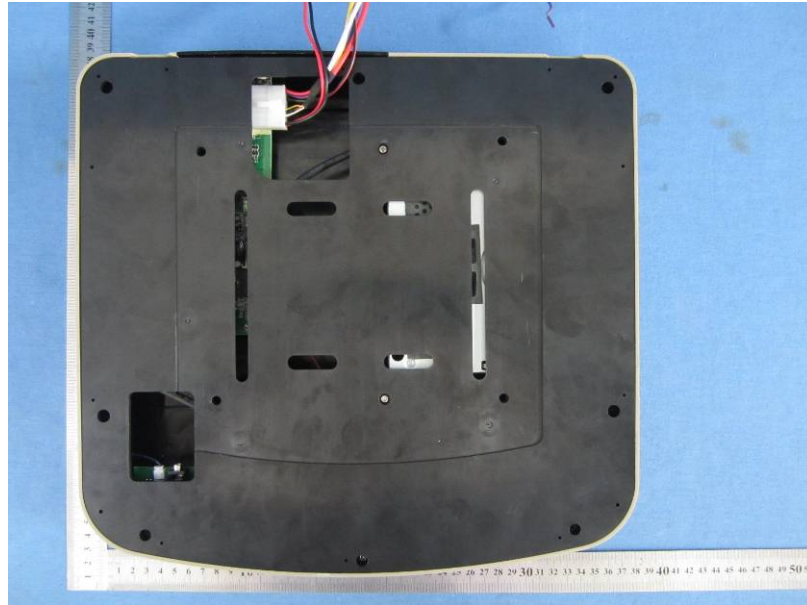
Radiated Emission



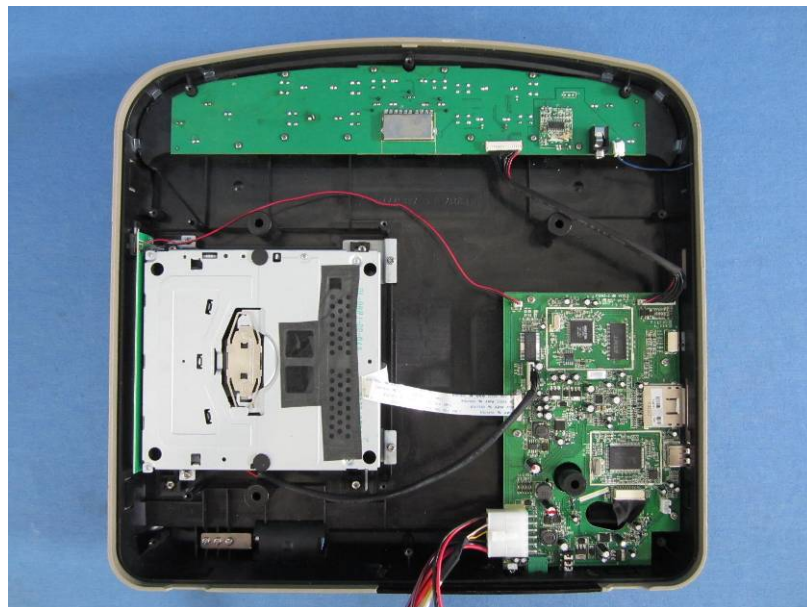
## 8 EUT Constructional Details

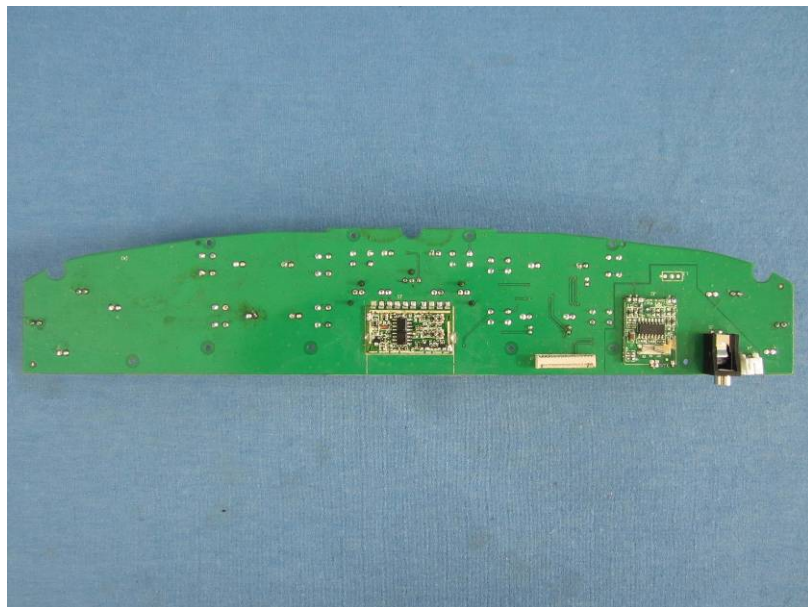
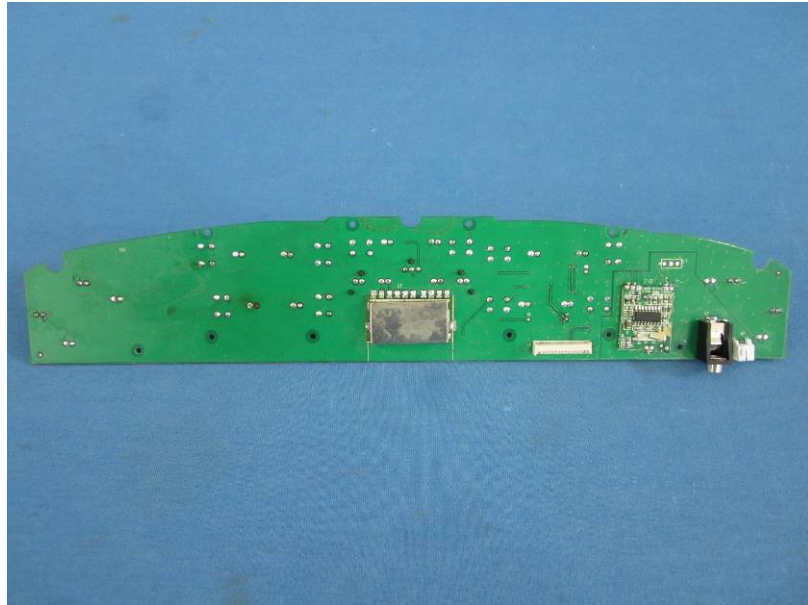


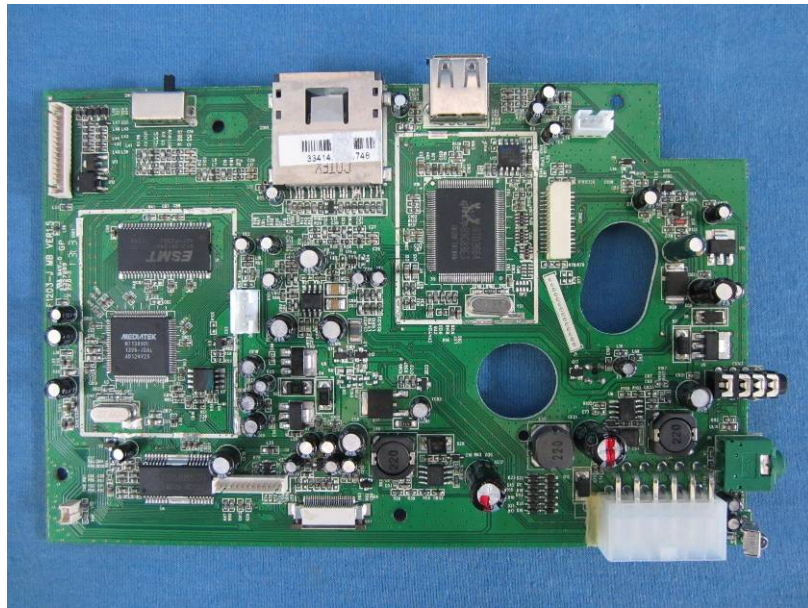
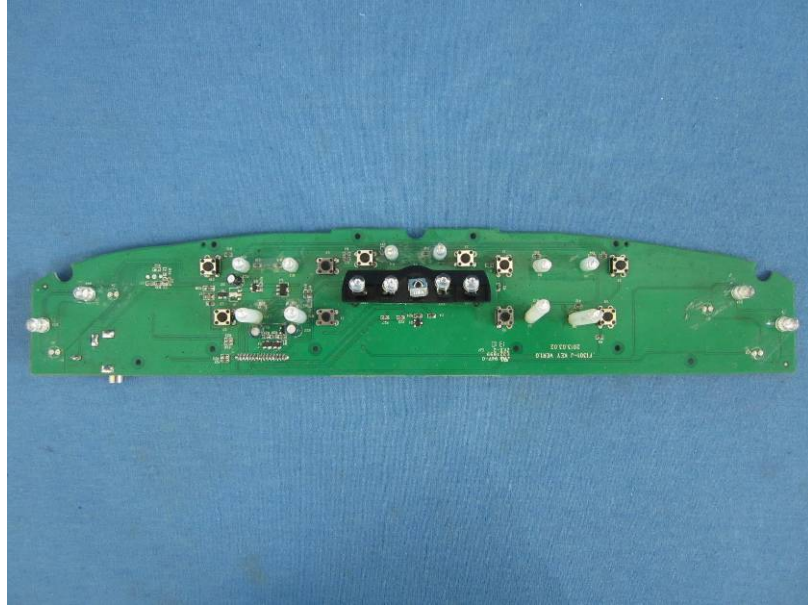


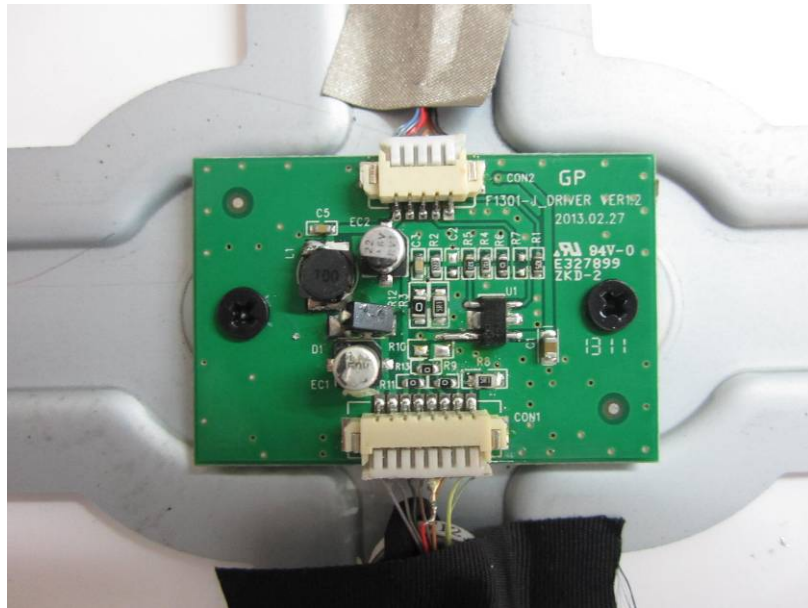
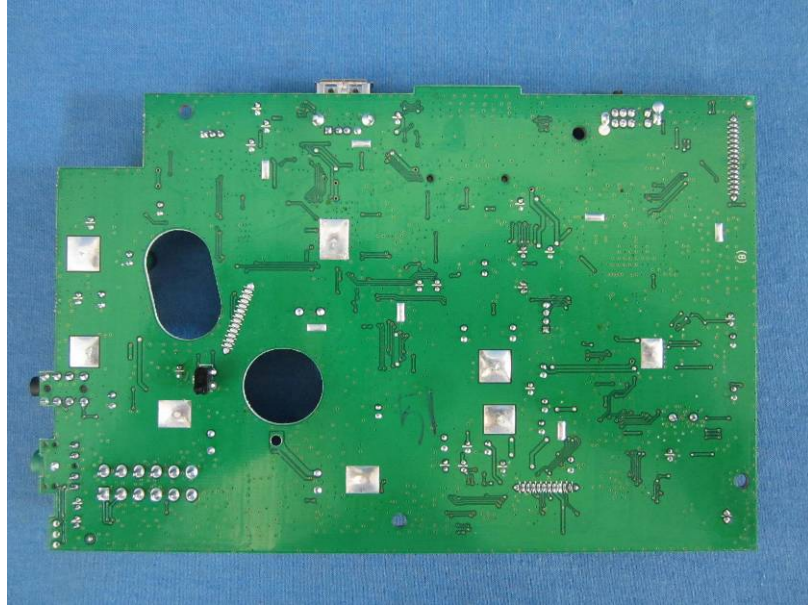














--End--