

TEST REPORT

Report No. : ISOTEK14080298F
FCC ID : AZQHD4K
Applicant : Shenzhen KOHO Technology Co.,Ltd
Address : Building3,Jin Yuda Industrial
Part,ShangLiao,Shajin,Baoan,Shenzhen
Manufacturer : Shenzhen KOHO Technology Co.,Ltd
Address : Building3,Jin Yuda Industrial
Part,ShangLiao,Shajin,Baoan,Shenzhen
Product Name : pico projector
Model No. : HD 4K
Standards : FCC PART15 SUBPART B: 2012
Date of Receipt sample : Aug.15,2014
Date of Test : Aug.15,2014 to Aug.25,2014
Date of Issue : Aug.25,2014
Test Result : **Pass ***

Remark:

* The sample described above has been tested to be in compliance with the requirements of ANSI C63.4:2003. The test results have been reviewed and comply with the rules listed above and found to meet their essential requirements.

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.

The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

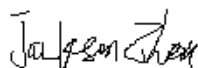
Shenzhen ISOTek Standards Technical Services Co.,Ltd.

13/F, HuaFengRui Building, XinHu Rd., XiXiang, Bao'an District,Shenzhen,China

Tel: +86-755-23087378

Fax: Tel: +86-755-23087278

Compiled by:

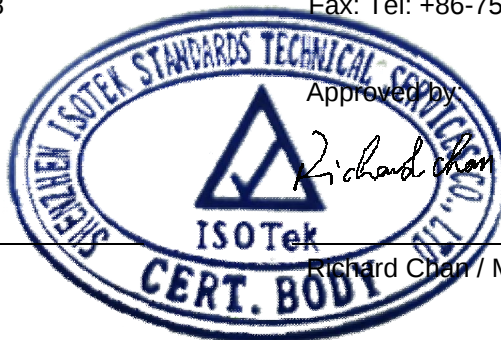


Jackson Zhou / Project Engineer

Approved by:



Richard Chan / Manager



1 Test Summary

Test Item	Test Requirement	Class	Test Method	Test Result
Power Line Conducted Emission (150kHz to 30MHz)	FCC PART 15, SUBPART B: 2012	Class B	ANSI C63.4: 2003	Pass
Radiated Emission (12MHz to 30MHz)	FCC PART 15, SUBPART B: 2012	Class B	ANSI C63.4: 2003	Pass
Radiated Emission (30MHz to 1GHz)	FCC PART 15, SUBPART B: 2012	Class B	ANSI C63.4: 2003	Pass
Radiated Emission (Above 1GHz)	FCC PART 15, SUBPART B: 2012	Class B	ANSI C63.4: 2003	Pass

Remark:

Pass Test item meets the requirement

Fail Test item does not meet the requirement

N/A Test case does not apply to the test object

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3 General Information

3.1 General Description of E.U.T.

Product Name..... : pico projector
Model No. : HD 4K
Model Difference : N/A

3.2 Details of E.U.T.

Technical Data..... : (1)DC 5V, 2000mA by adapter
(Adapter Input: AC 100-240V, 50/60Hz, 0.5A max)
(2)DC 7.4V by battery(Capacity: 2000mAh)
Adapter..... : M/N: BI10-050200-I
Lowest OSC Frequency 12MHz
Highest frequency 1.2GHz

3.3 Standards Applicable for Testing

The tests were performed according to following standards:

FCC PART 15, SUBPART B: Electronic Code of Federal Regulations- Unintentional Radiators
2012

3.4 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, July 12, 2012.

- **FCC – Registration No.: 880581**

Waltek Services (Shenzhen) Co., Ltd. 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 880581, April 29, 2014.

3.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

3.6 Abnormalities from Standard Conditions

None.

4 Equipment Used during Test

4.1 Equipment List

Conducted Emissions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.18,2013	Sep.17,2014
2.	LISN	R&S	ENV216	101215	Nov. 29,2013	Nov. 28,2014
3.	Cable	Top	TYPE16(3.5 M)	-	Sep.18,2013	Sep.17,2014
3m Semi-anechoic Chamber for Radiation						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.18,2013	Sep.17,2014
2	Active Loop Antenna (9kHz-30MHz)	Beijing Dazhi	ZN30900A	-	Sep.18,2013	Sep.17,2014
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.19,2014	Apr.18,2015
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.18,2013	Sep.17,2014
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.19,2014	Apr.18,2015
6	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2014	Mar.16,2015
7	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.10,2014	Apr.09,2015

4.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
USB Disk	Apacer	4GB	
SD Disk	Kingston	4GB	
Headphone	Qisheng	S-325	N/A
DVD player	Panasonic	DVD-S858	VC8SQ002056
MacBook Air	APPLE	A1465(EW03039-1)	C17KTQDNF5N7
Notebook	LENOVO	X201i	75Y4408

4.3 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	$\pm 3.64\text{dB}$	(1)
Radiation Emission	30MHz~1000MHz	$\pm 5.03\text{dB}$	(1)
	1GHz~6GHz	$\pm 5.47\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5 Emission Test Results

5.1 Power Line Conducted Emission, 150kHz to 30MHz

Test Requirement..... : FCC PART 15, SUBPART B
 Test Method : ANSI C63.4
 Test Result : Pass
 Frequency Range..... : 150kHz to 30MHz
 Class : Class B
 Limit..... :

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

5.1.1 E.U.T. Operation

Operating Environment:

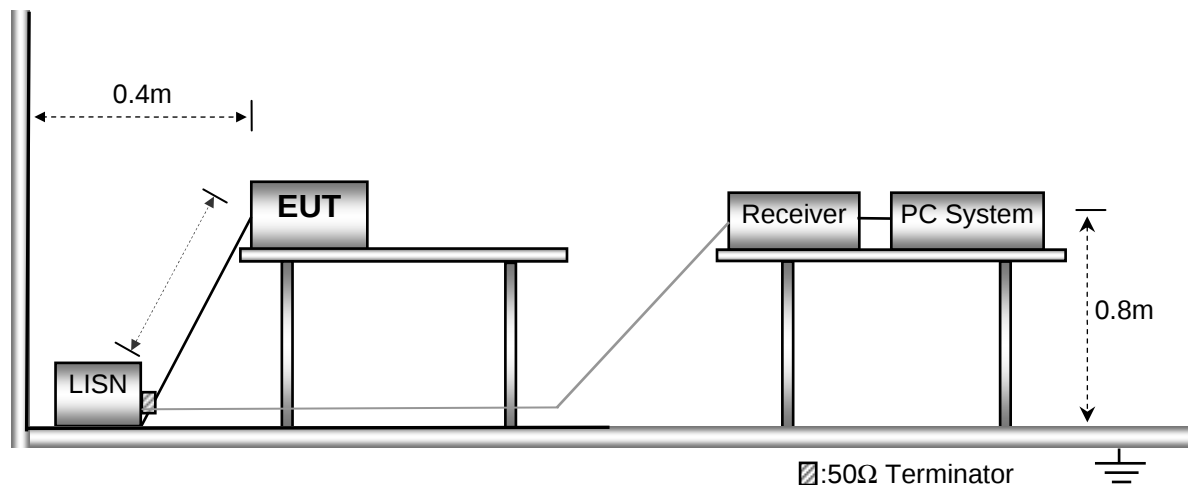
Temperature..... : 23°C
 Humidity : 53.6%RH
 Atmospheric Pressure : 101kPa

EUT Operation:

Input Voltage : (1)DC 5V by adapter input AC 120V/60Hz
 Operating Mode..... : USB Data transmitting mode, SD Car Playing mode
 HDMI IN mode, AV IN mode
 Remark..... : The worst case is data transmitting mode and the data is listed in next page.

5.1.2 Block Diagram of Test Setup

The Mains Terminals Disturbance Voltage tests were performed in accordance with the ANSI C63.4 .

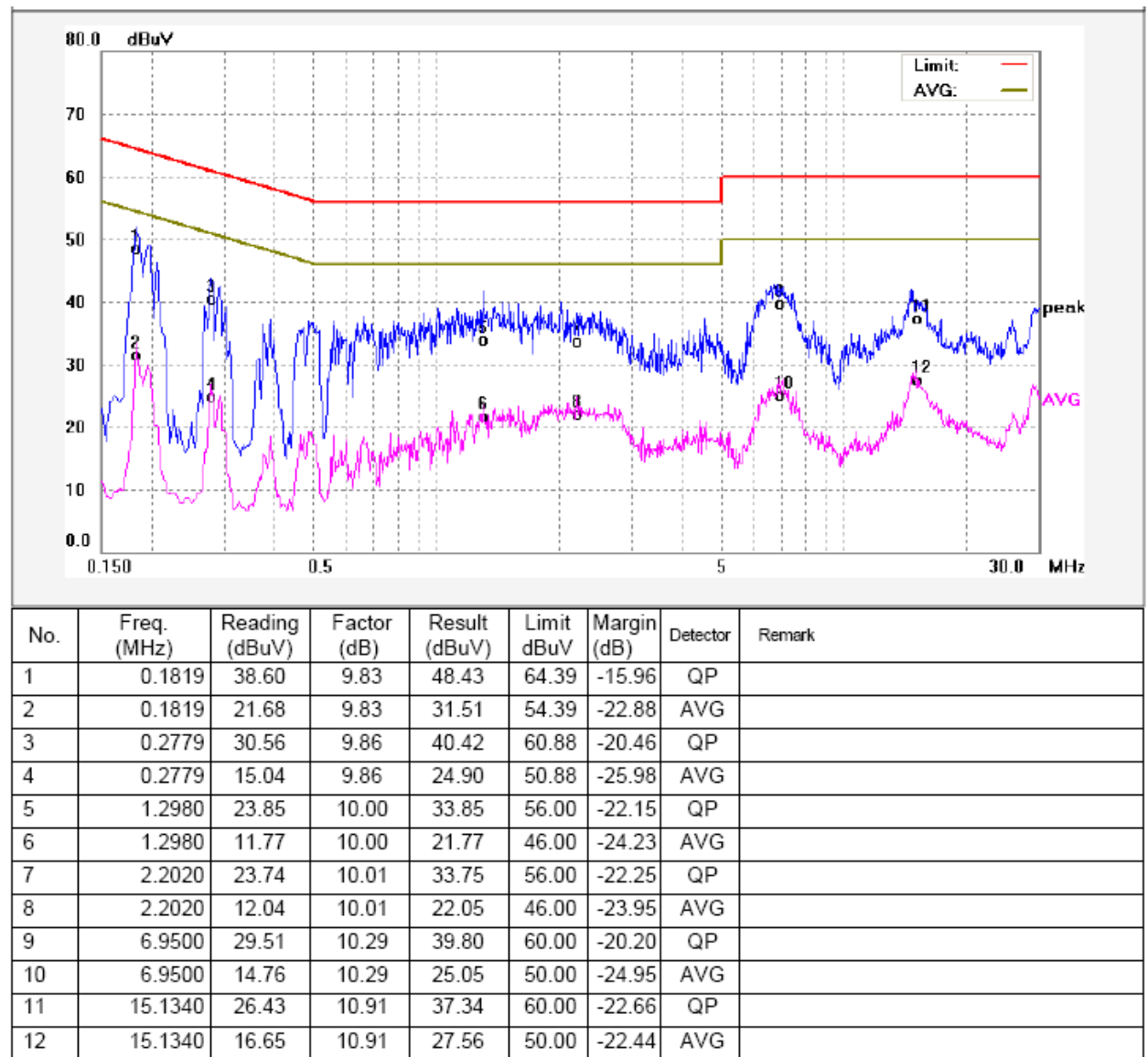


5.1.3 Measurement Data

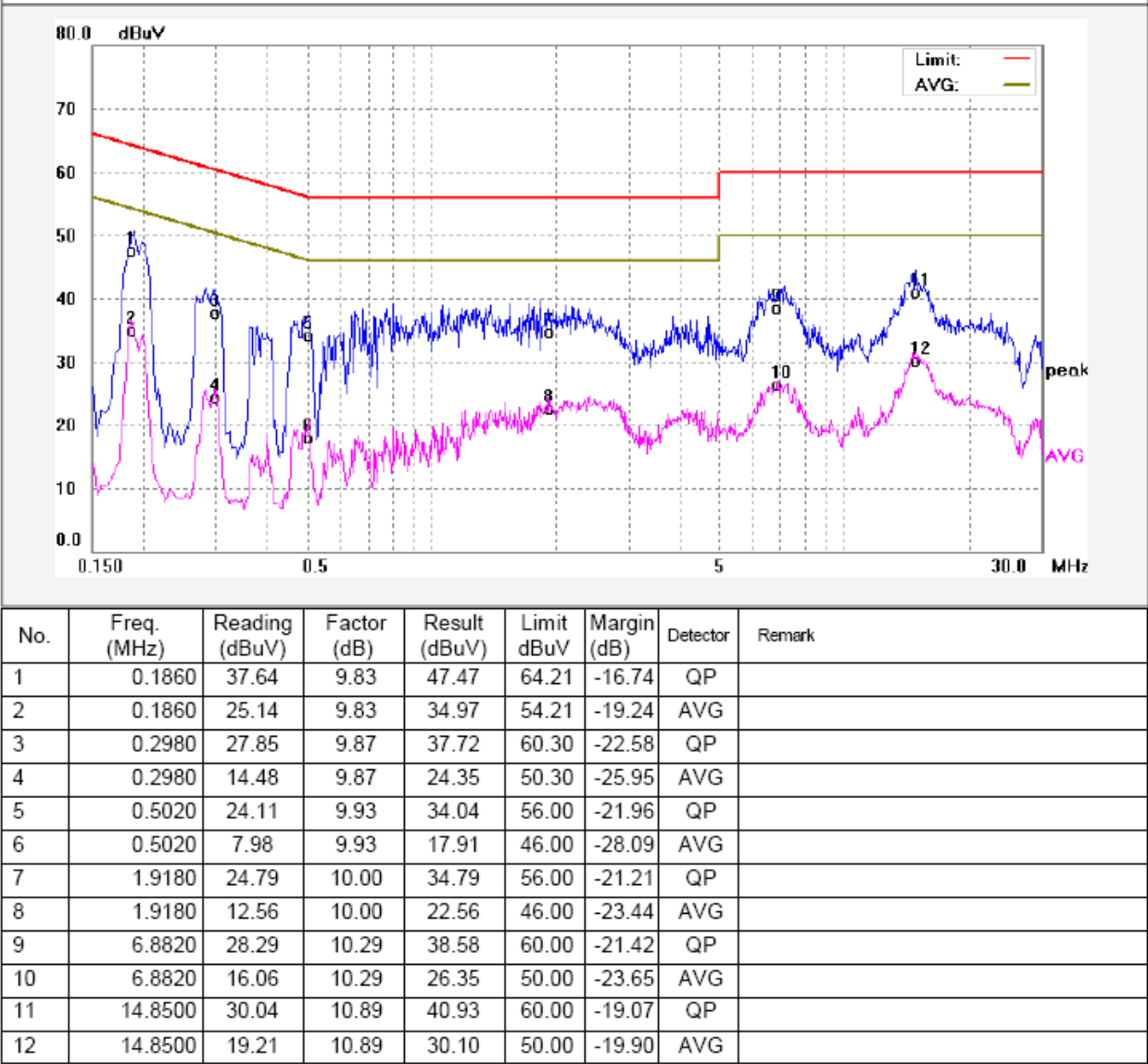
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line. According to the data in section 5.1.4, the EUT complied with the FCC PART 15, SUBPART B standards.

5.1.4 Power Line Conducted Emission Test Data

Live Line:



Neutral Line:



5.2 Radiation Emission, Below 30MHz

Test Requirement..... : FCC PART 15, SUBPART B
 Test Method..... : ANSI C63.4
 Test Result : Pass
 Frequency Range : 12MHz to 30MHz
 Class. : Class B
 Limit..... :

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$

5.2.1 E.U.T. Operation

Operating Environment:

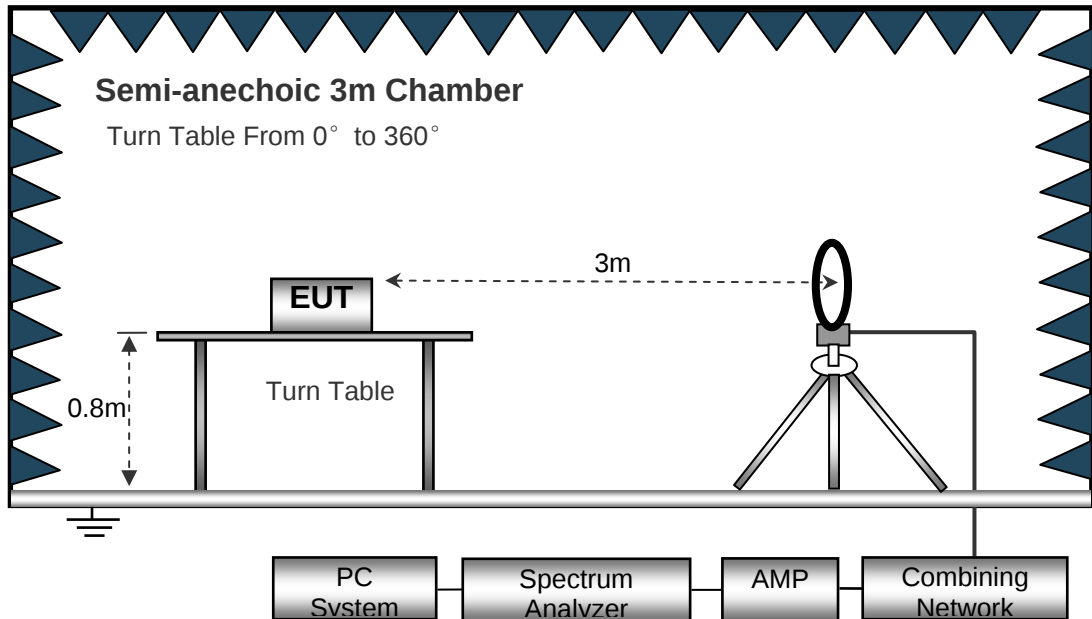
Temperature : 23°C
 Humidity : 54.1%RH
 Atmospheric Pressure : 101kPa

EUT Operation:

Input Voltage : (1)DC 5V by adapter input AC 120V/60Hz
 (2)DC 7.4V by battery
 Operating Mode..... : USB Data transmitting mode, SD Car Playing mode
 HDMI IN mode, AV IN mode
 Remark..... : The worst case is data transmitting mode under the condition of
 adapter power input and the data is listed in next page.

5.2.2 Block Diagram of Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.



5.2.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Quasi-peak measurements were performed if peak emissions were within 6dB of the Quasi-peak limit line.

5.2.4 Radiated Emission Test Data

Frequency Range: 12MHz to 30MHz

The measurements were more than 20 dB below the limit and not reported.

5.3 Radiation Emission, 30MHz ~ 1000MHz

Test Requirement..... : FCC PART 15, SUBPART B
 Test Method..... : ANSI C63.4
 Test Result : Pass
 Frequency Range : 30MHz to 1000MHz
 Class. : Class B
 Limit..... :

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

5.3.1 E.U.T. Operation

Operating Environment:

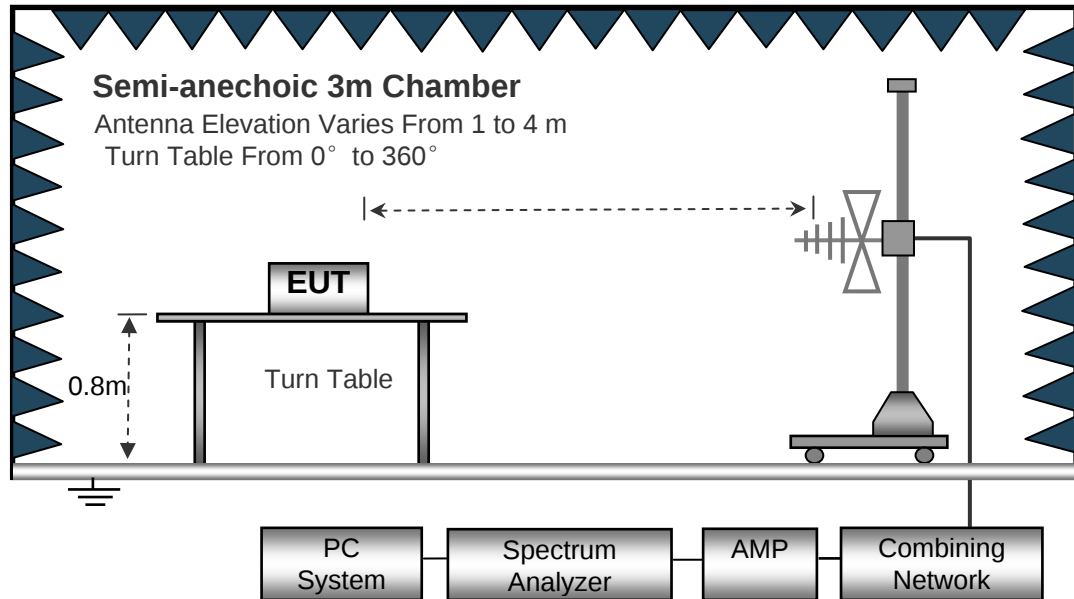
Temperature..... : 23°C
 Humidity : 54.1%RH
 Atmospheric Pressure : 101kPa

EUT Operation:

Input Voltage : (1)DC 5V by adapter input AC 120V/60Hz
 (2)DC 7.4V by battery
 Operating Mode..... : USB Data transmitting mode, SD Car Playing mode
 HDMI IN mode, AV IN mode
 Remark..... : The worst case is data transmitting mode under the condition of
 adapter power input and the data is listed in next page.

5.3.2 Block Diagram of Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.

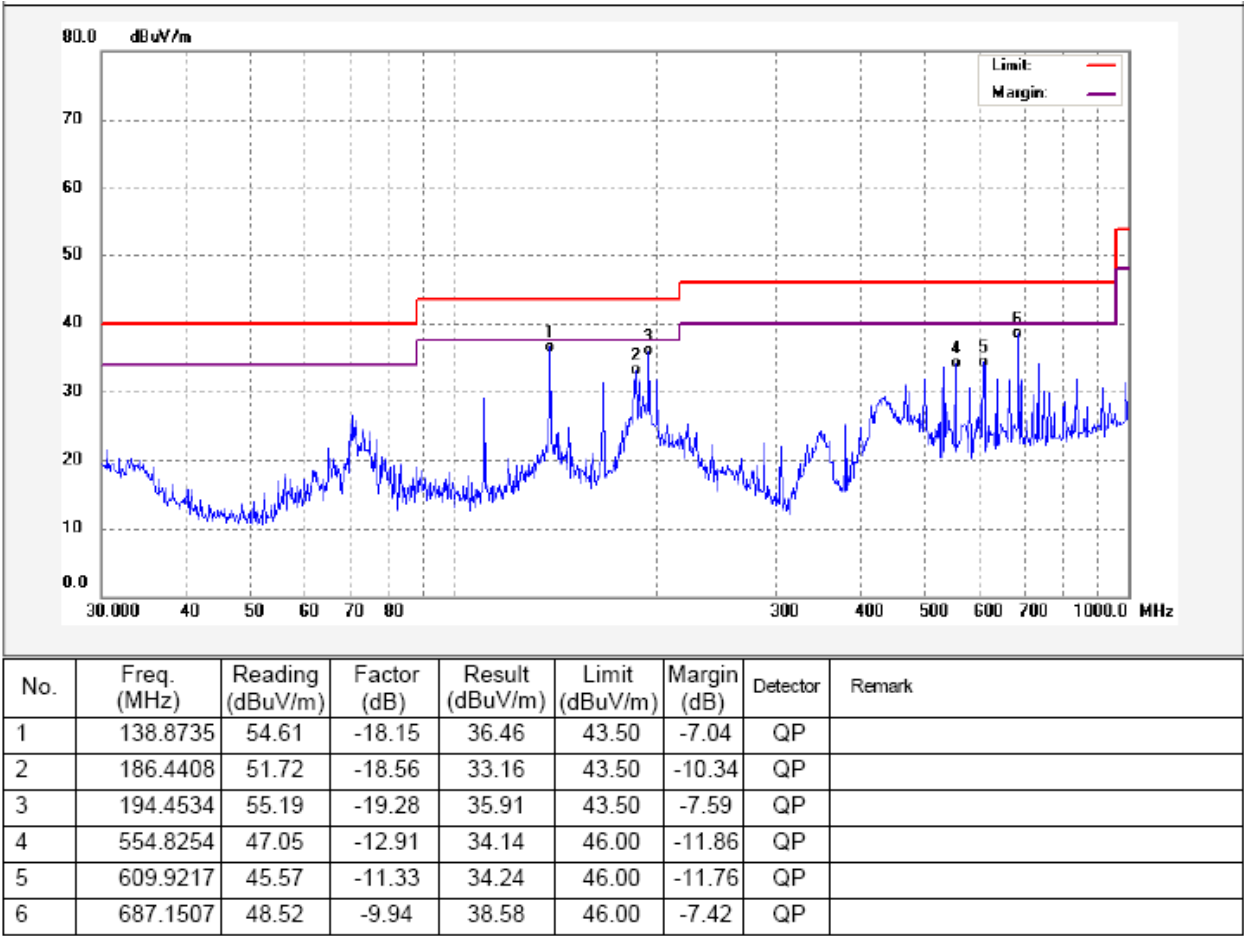


5.3.3 Measurement Data

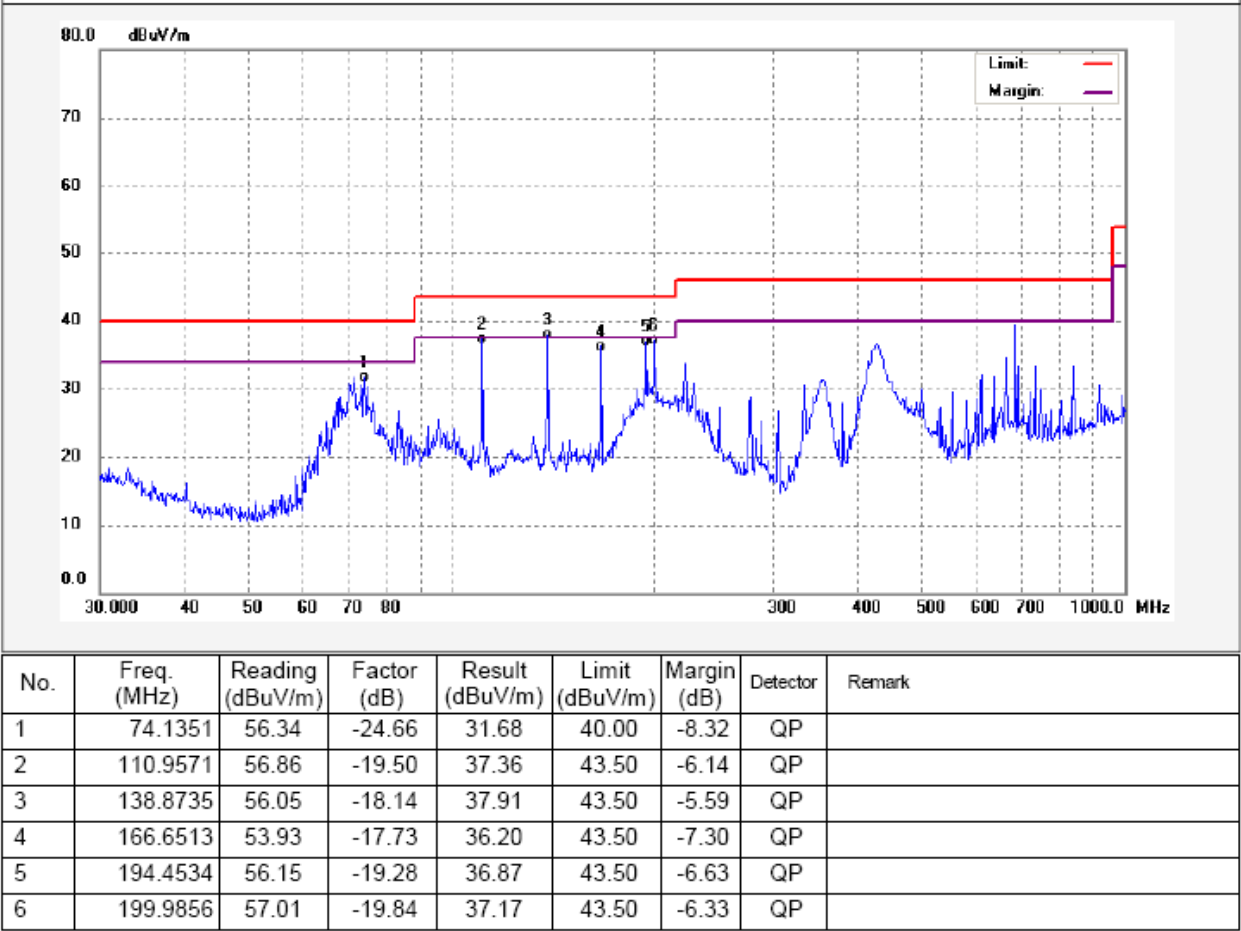
The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Quasi-peak measurements were performed if peak emissions were within 6dB of the Quasi-peak limit line.

5.3.4 Radiated Emission Test Data

Antenna Polarization: Vertical



Antenna Polarization: Horizontal



5.4 Radiation Emission, Above 1000MHz

Test Requirement..... : FCC PART 15, SUBPART B
 Test Method : ANSI C63.4
 Test Result : Pass
 Frequency Range..... : 1GHz~6GHz
 Class. : Class B
 Limit.. :

Frequency Range (MHz)	Distance (Meter)	Average Limit dB(uV/m)	Peak Limit (dBuV/m)
Above 1GHz	3	54	74

5.4.1 E.U.T. Operation

Operating Environment:

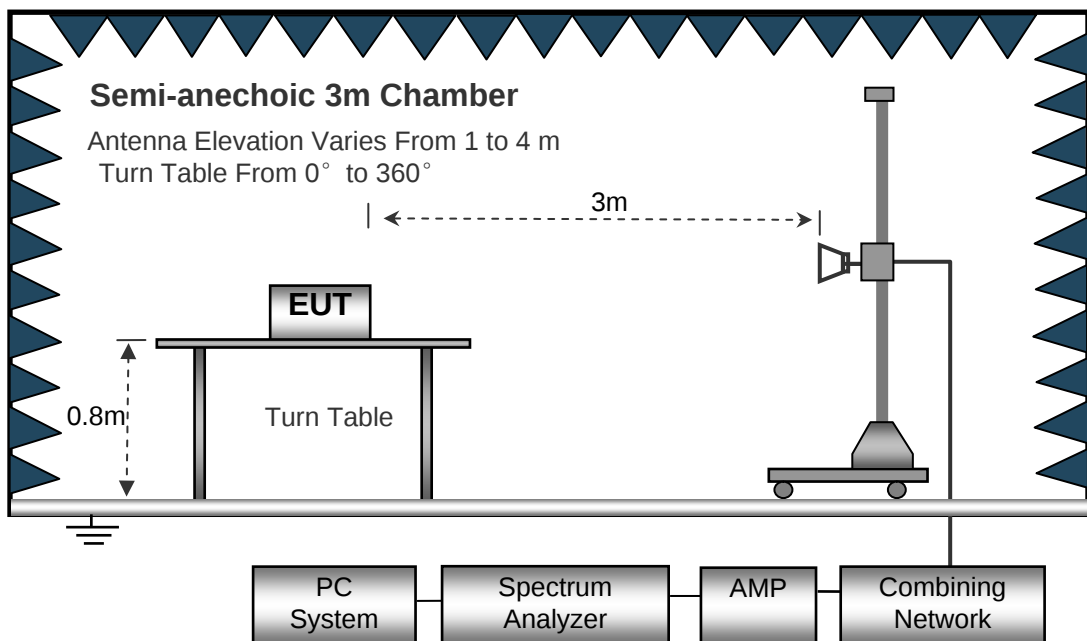
Temperature : 23°C
 Humidity..... : 52.6%RH
 Atmospheric Pressure : 101.3kPa

EUT Operation:

Input Voltage : (1)DC 5V by adapter input AC 120V/60Hz
 (2)DC 7.4V by battery
 Operating Mode..... : USB Data transmitting mode, SD Car Playing mode
 HDMI IN mode, AV IN mode
 Remark..... : The worst case is data transmitting mode under the condition of adapter power input and the data is listed in next page.

5.4.2 Block Diagram of Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.

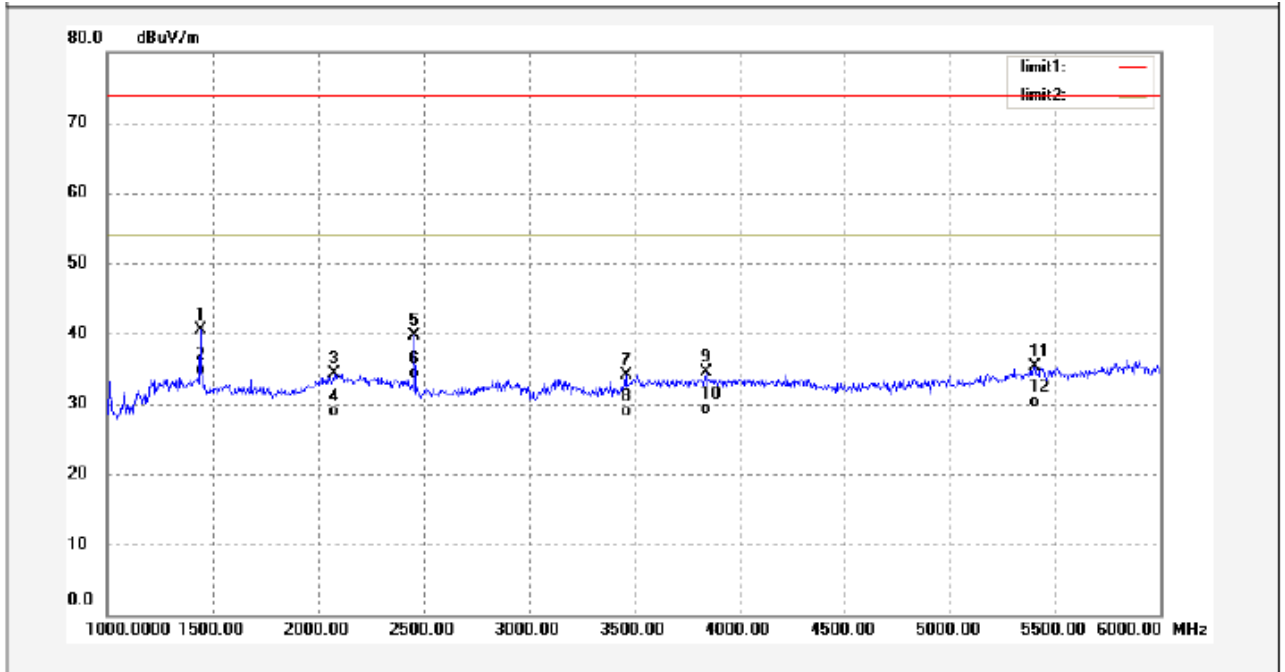


5.4.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Average measurements were performed if peak emissions were within 6dB of the average limit line

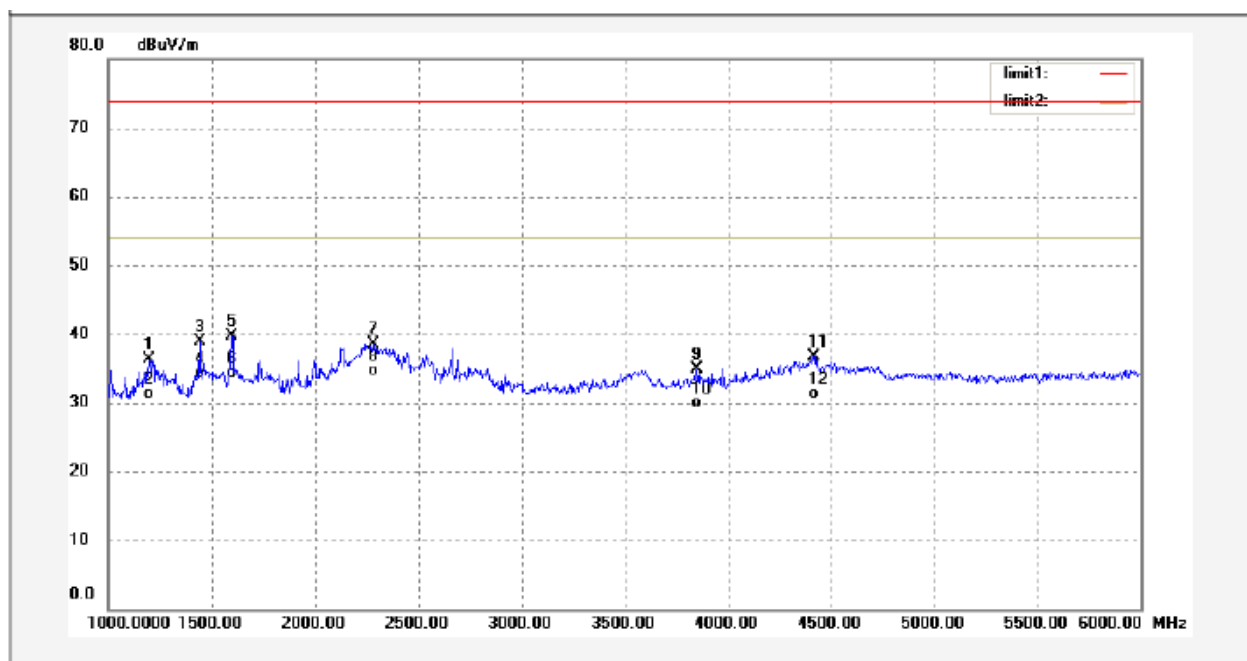
5.4.4 Radiated Emission Test Data, Above 1000MHz

Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1440.000	57.78	-17.37	40.41	74.00	-33.59	peak	
2	1440.000	51.47	-17.37	34.10	54.00	-19.90	AVG	
3	2075.000	50.09	-15.79	34.30	74.00	-39.70	peak	
4	2075.000	43.98	-15.79	28.19	54.00	-25.81	AVG	
5	2455.000	55.50	-15.71	39.79	74.00	-34.21	peak	
6	2455.000	49.22	-15.71	33.51	54.00	-20.49	AVG	
7	3460.000	48.67	-14.56	34.11	74.00	-39.89	peak	
8	3460.000	42.69	-14.56	28.13	54.00	-25.87	AVG	
9	3840.000	48.14	-13.65	34.49	74.00	-39.51	peak	
10	3840.000	42.21	-13.65	28.56	54.00	-25.44	AVG	
11	5400.000	47.02	-11.79	35.23	74.00	-38.77	peak	
12	5400.000	41.26	-11.79	29.47	54.00	-24.53	AVG	

Antenna Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1195.000	53.95	-17.70	36.25	74.00	-37.75	peak	
2	1195.000	48.24	-17.70	30.54	54.00	-23.46	AVG	
3	1440.000	56.21	-17.37	38.84	74.00	-35.16	peak	
4	1440.000	50.89	-17.37	33.52	54.00	-20.48	AVG	
5	1595.000	57.57	-17.85	39.72	74.00	-34.28	peak	
6	1595.000	51.42	-17.85	33.57	54.00	-20.43	AVG	
7	2285.000	53.61	-15.12	38.49	74.00	-35.51	peak	
8	2285.000	48.99	-15.12	33.87	54.00	-20.13	AVG	
9	3850.000	48.43	-13.62	34.81	74.00	-39.19	peak	
10	3850.000	42.74	-13.62	29.12	54.00	-24.88	AVG	
11	4415.000	49.69	-12.90	36.79	74.00	-37.21	peak	
12	4415.000	43.42	-12.90	30.52	54.00	-23.48	AVG	

6 Photographs – Test Setup

6.1 Photograph –Power Line Conducted Emission Test Setup

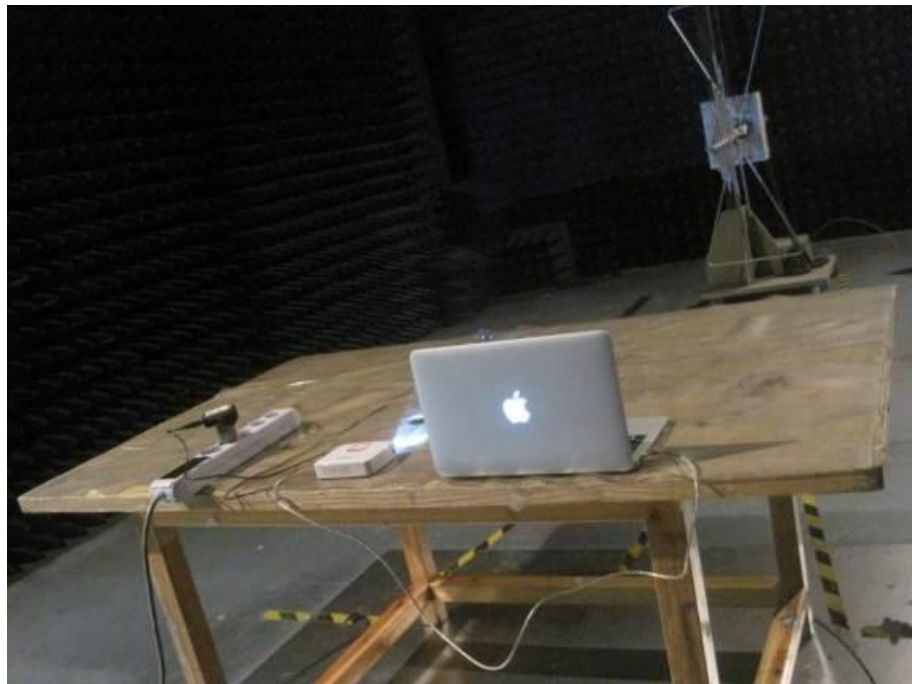
Data transmitting mode



6.2 Photograph – Radiated Emission Test Setup for 12MHz ~ 30MHz



6.3 Photograph – Radiated Emission Test Setup for 30MHz ~ 1000MHz



6.4 Photograph – Radiated Emission Test Setup for Above 1GHz

Data transmitting mode



7 Photographs – Constructional Details

7.1 EUT – Appearance View



7.2 EUT – Front View



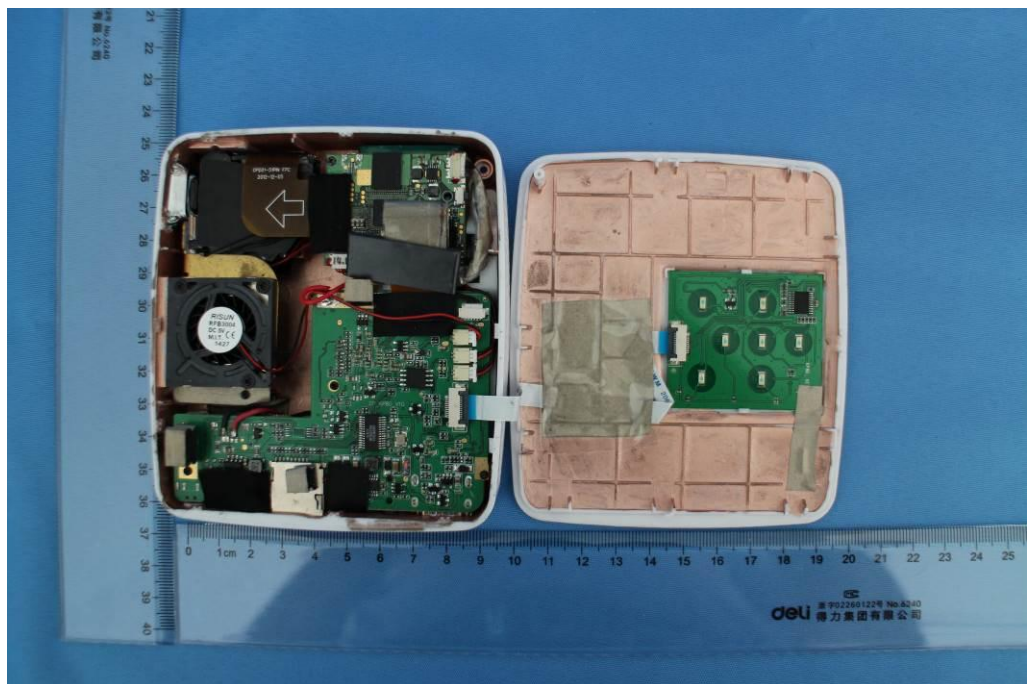
7.3 EUT – Back View



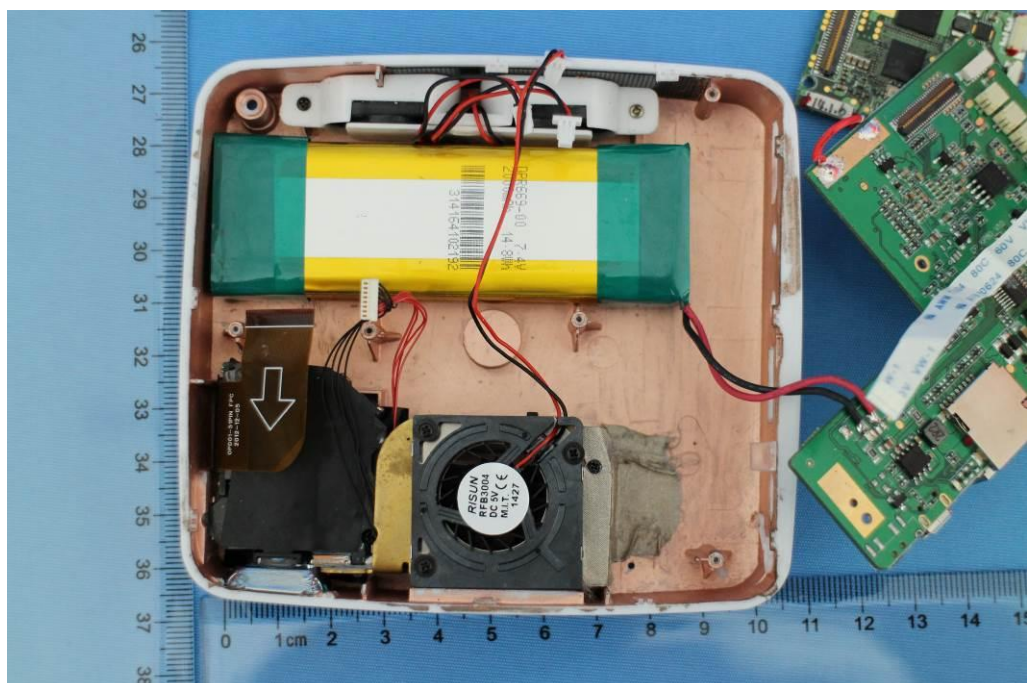
7.4 EUT – Side View



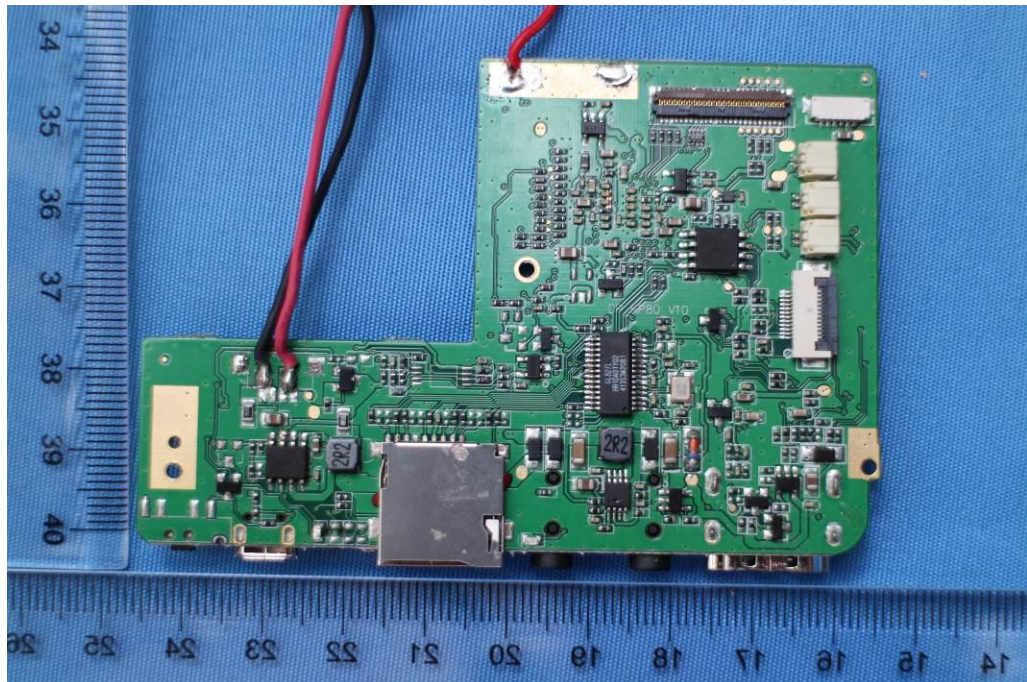
7.5 EUT – Open View (1)



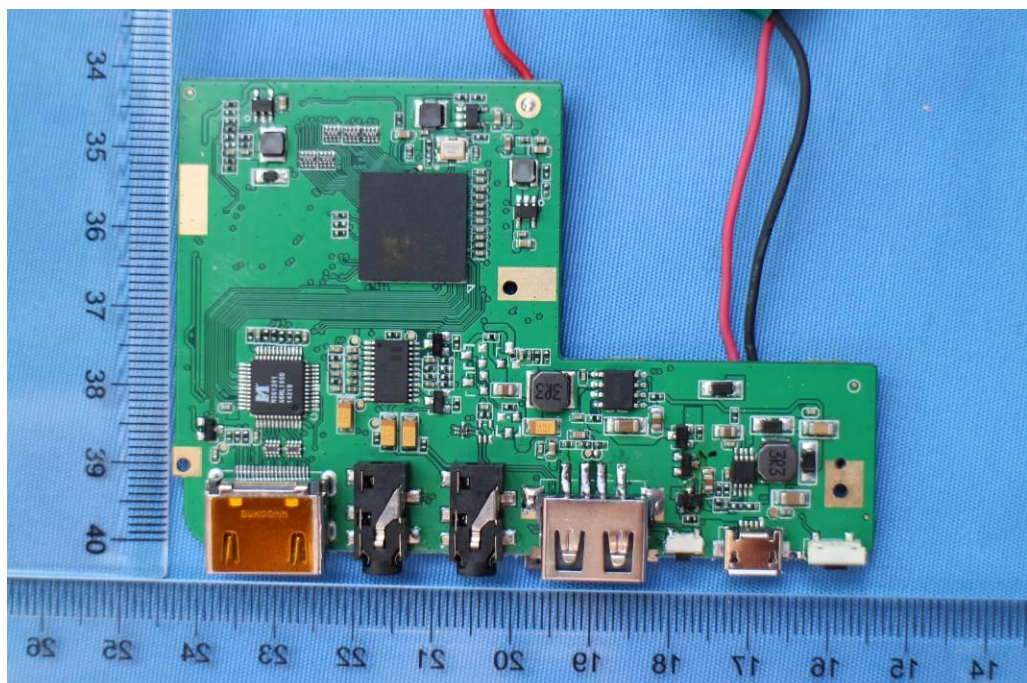
7.6 EUT – Open View (2)



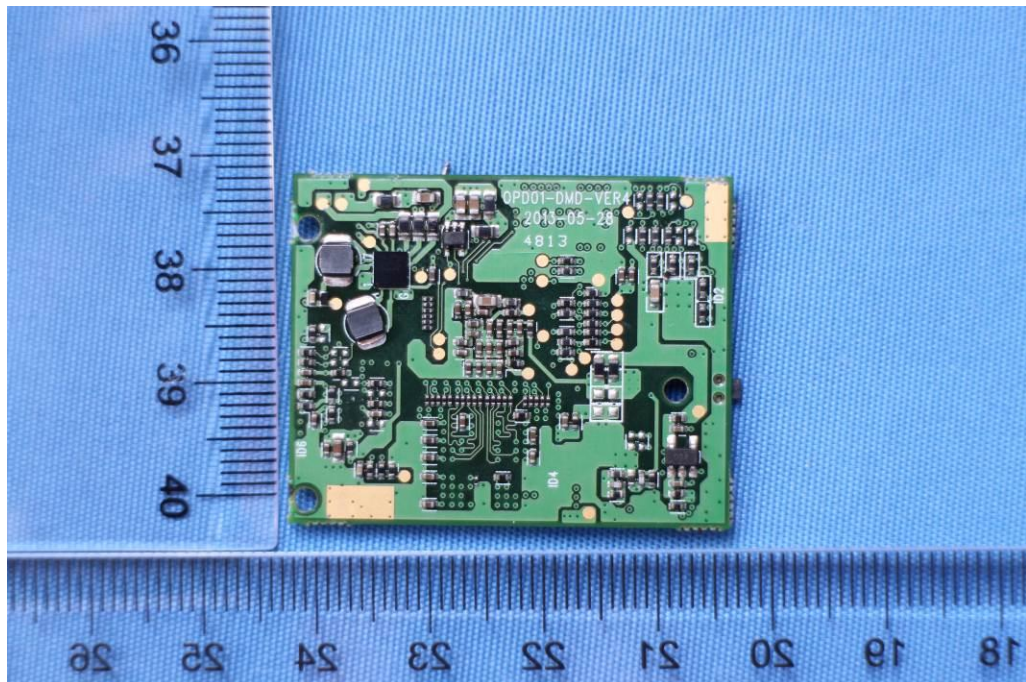
7.7 EUT – PCB Front View (1)



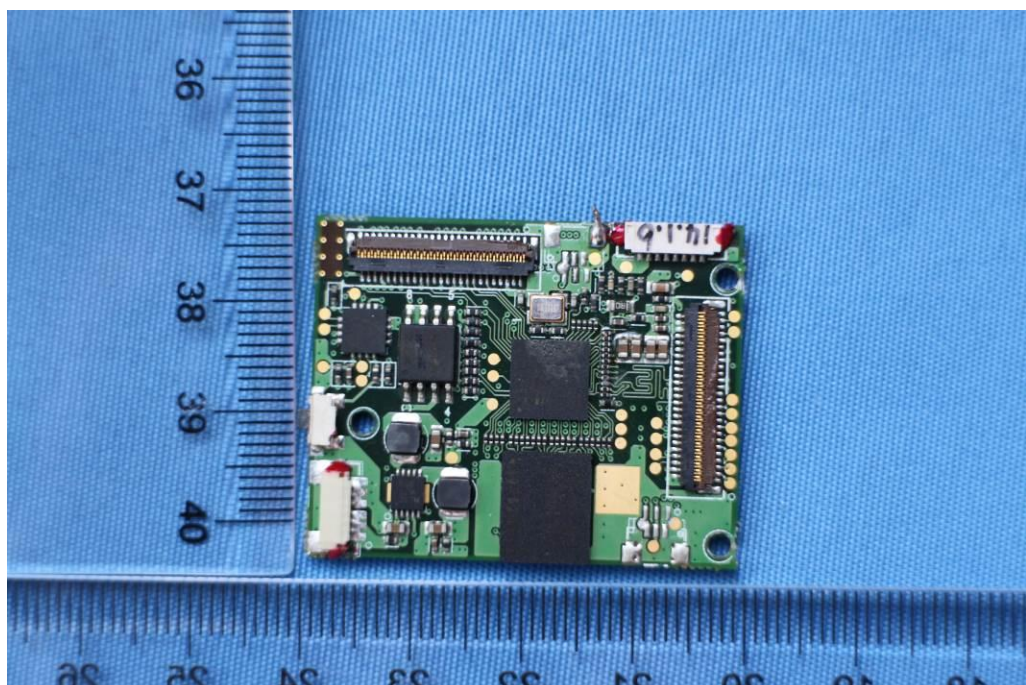
7.8 EUT – PCB Back View (2)



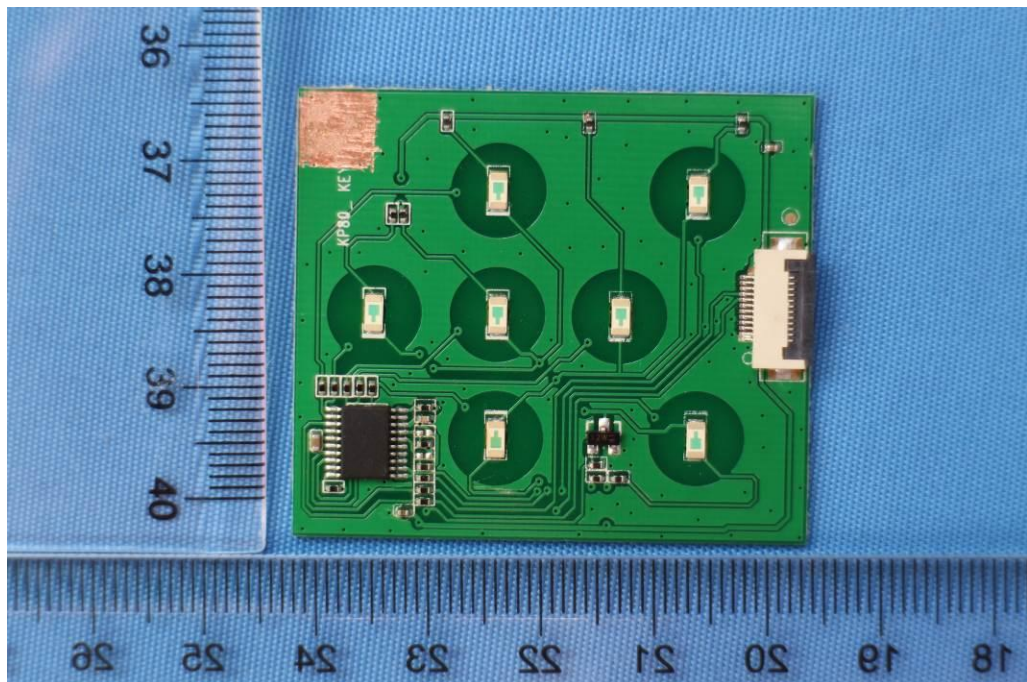
7.9 EUT – PCB Front View (3)



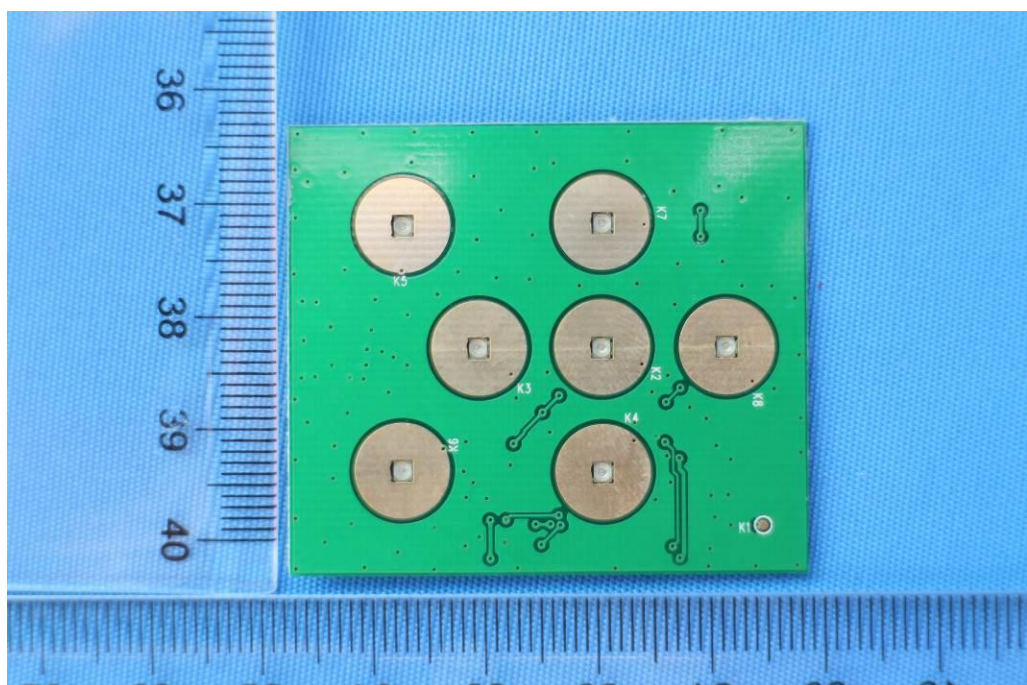
7.10 EUT – PCB Back View (4)



7.11 EUT – PCB Front View (5)



7.12 EUT – PCB Back View (6)



7.13 Adapter –Appearance View



=====End of Report=====