

FCC Report

Applicant: Mitac International Corporation

Address of Applicant: Building B, No.209, Sec.1, Nan Gang Rd., Nan Gang Taipei,
11568 Taiwan

Equipment Under Test (EUT)

Product Name: GPS Portable Navigation Device

Model No.: N509M-5000, N509M-4300

Trade Mark: Magellan

FCC ID: P4Q-N509M

Applicable standards: FCC CFR Title 47 Part 15 Subpart B:2014

Date of sample receipt: June 30, 2015

Date of Test: July 01-July 02, 2015

Date of report issue: July 02, 2015

Test Result : PASS *

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

Authorized Signature:



The logo is circular with 'GTS' in the center, 'GLOBAL TESTING' below it, and 'GLOBAL TECHNOLOGY SERVICES CO., LTD.' around the perimeter. A handwritten signature is written over the logo.

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.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS or testing done by GTS in connection with, distribution or use of the product described in this report must be approved by GTS in writing.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2 Version

Version No.	Date	Description
00	July 02, 2015	Original

Prepared By:

Edward Pan

Date:

July 02, 2015

Project Engineer

Check By:

Hank Yan

Date:

July 02, 2015

Reviewer

3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 TEST SUMMARY	4
4.1 MEASUREMENT UNCERTAINTY.....	4
5 GENERAL INFORMATION	5
5.1 CLIENT INFORMATION.....	5
5.2 GENERAL DESCRIPTION OF EUT	5
5.3 TEST MODE	5
5.4 TEST FACILITY	6
5.5 TEST LOCATION.....	6
5.6 DESCRIPTION OF SUPPORT UNITS	6
5.7 DEVIATION FROM STANDARDS	6
5.8 ABNORMALITIES FROM STANDARD CONDITIONS.....	6
5.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
6 TEST INSTRUMENTS LIST	7
7 TEST RESULTS AND MEASUREMENT DATA.....	8
7.1 CONDUCTED EMISSIONS	8
7.2 RADIATED EMISSION	11
8 TEST SETUP PHOTO	17
9 EUT CONSTRUCTIONAL DETAILS	19

4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part15.107	PASS
Radiated Emissions	Part15.109	PASS

PASS: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 26.5GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(1)

Note (1): The measurement uncertainty is for coverage factor of $k=2$ and a level of confidence of 95%.

Remark: Test according to ANSI C63.4:2009

5 General Information

5.1 Client Information

Applicant:	Mitac International Corporation
Address of Applicant:	Building B, No.209, Sec.1, Nan Gang Rd., Nan Gang Taipei, 11568 Taiwan
Manufacturer:	Dongguan Yuanfeng Technology Co., Ltd.
Address of Manufacturer:	No. 18, Industrial East Road, Songshan Lake Hi-Tech Industrial Development Zone, Dongguan, Guangdong, 523808, China

5.2 General Description of EUT

Product Name:	GPS Portable Navigation Device
Model No.:	N509M-5000, N509M-4300
<i>Remark: The two models are identical in the same PCB layout, interior structure and electrical circuits. The difference between the two models is the screen size and the model number. Two models were tested and found the data of N509M-5000 is worse. Only the data of the worst model is reported.</i>	
Power Supply:	Car Charger: Model No.: YLS-DC40V Input: DC12V-30V Output: DC5V-1500mA Or DC 3.7V, 1500mAh Li-ion Battery

5.3 Test mode

Test mode:	
PC mode	Keep the EUT in PC mode
TF Card Playing mode	Keep the EUT in TF Card Playing mode

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **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.

- **FCC —Registration No.: 600491**

Global United Technology Services 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 files. Registration 600491, June 28, 2013.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

5.6 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
Apple	PC	A1278	C1MN99ERDTY3	DoC
DELTA	ADAPTER	ADP-60ADT	N/A	Verification
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC

5.7 Deviation from Standards

Biconical, log.per. antenna and horn antenna were used instead of dipole antenna. Semi-anechoic Chamber was used as alternation of open air test sites, and all test suites were performed with radiated method in it.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

6 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	9.0(L)*6.0(W)* 6.0(H)	GTS250	Mar. 27 2015	Mar. 26 2016
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	June 30 2015	June 29 2016
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	June 30 2015	June 29 2016
5	Double -ridged waveguide horn	SCHWARZBECK	9120D	GTS208	June 26 2015	June 25 2016
6	RF Amplifier	HP	8347A	GTS204	June 30 2015	June 29 2016
7	Preamplifier	HP	8349B	GTS206	June 30 2015	June 29 2016
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	June 30 2015	June 29 2016
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	June 30 2015	June 29 2016
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	June 30 2015	June 29 2016
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 30 2015	June 29 2016
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	June 30 2015	June 29 2016
6	Coaxial Cable	GTS	N/A	GTS227	June 30 2015	June 29 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 08 2014	July 07 2015

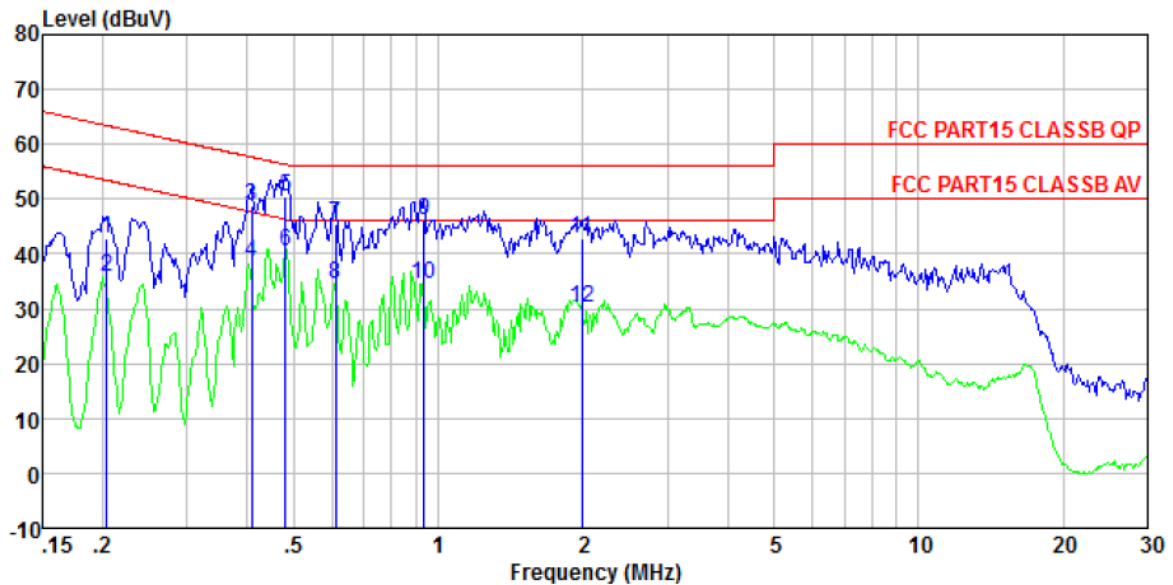
7 Test Results and Measurement Data

7.1 Conducted Emissions

Test Requirement:	FCC Part15 B Section 15.107																
Test Method:	ANSI C63.4:2009																
Test Frequency Range:	150KHz to 30MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																
Limit:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> <p>* Decreases with the logarithm of the frequency.</p>			Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)																
	Quasi-peak	Average															
0.15-0.5	66 to 56*	56 to 46*															
0.5-5	56	46															
5-30	60	50															
Test setup:	<div><p style="text-align: center;">Reference Plane</p><p style="text-align: center;">Test table/Insulation plane</p><p><i>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</i></p></div>																
Test procedure:	<div><div>1. The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</div><div>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</div><div>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.</div></div>																
Test Instruments:	Refer to section 6 for details																
Test mode:	Refer to section 5.3 for details																
Test results:	Pass																

Measurement Data

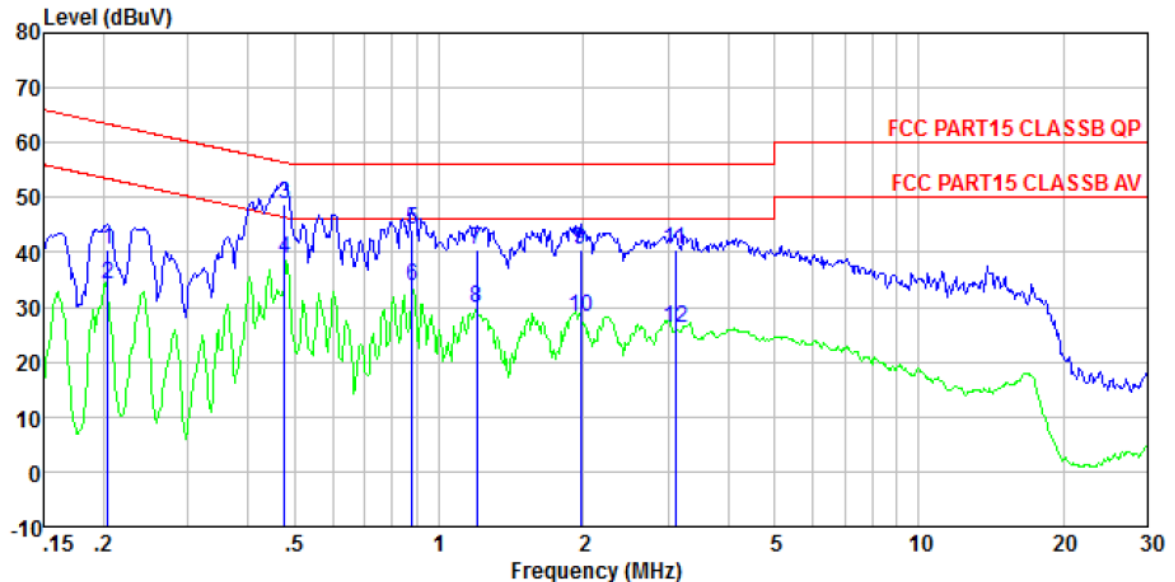
Line:



Site : Shielded room
Condition : FCC PART15 CLASSB QP LISN-2013 LINE
Job No. : 1144RF
Test mode : PC mode
Test Engineer: Song

	Freq	Read Level	Cable Loss	LISN Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.204	42.67	0.13	0.13	42.93	63.45	-20.52	QP
2	0.204	35.63	0.13	0.13	35.89	53.45	-17.56	Average
3	0.408	48.65	0.11	0.11	48.87	57.68	-8.81	QP
4	0.408	38.13	0.11	0.11	38.35	47.68	-9.33	Average
5	0.481	50.19	0.11	0.12	50.42	56.32	-5.90	QP
6	0.481	40.27	0.11	0.12	40.50	46.32	-5.82	Average
7	0.611	45.37	0.12	0.13	45.62	56.00	-10.38	QP
8	0.611	34.18	0.12	0.13	34.43	46.00	-11.57	Average
9	0.933	45.79	0.13	0.14	46.06	56.00	-9.94	QP
10	0.933	34.35	0.13	0.14	34.62	46.00	-11.38	Average
11	1.991	42.65	0.15	0.12	42.92	56.00	-13.08	QP
12	1.991	30.01	0.15	0.12	30.28	46.00	-15.72	Average

Neutral:



Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 1144RF
 Test mode : PC mode
 Test Engineer: Song

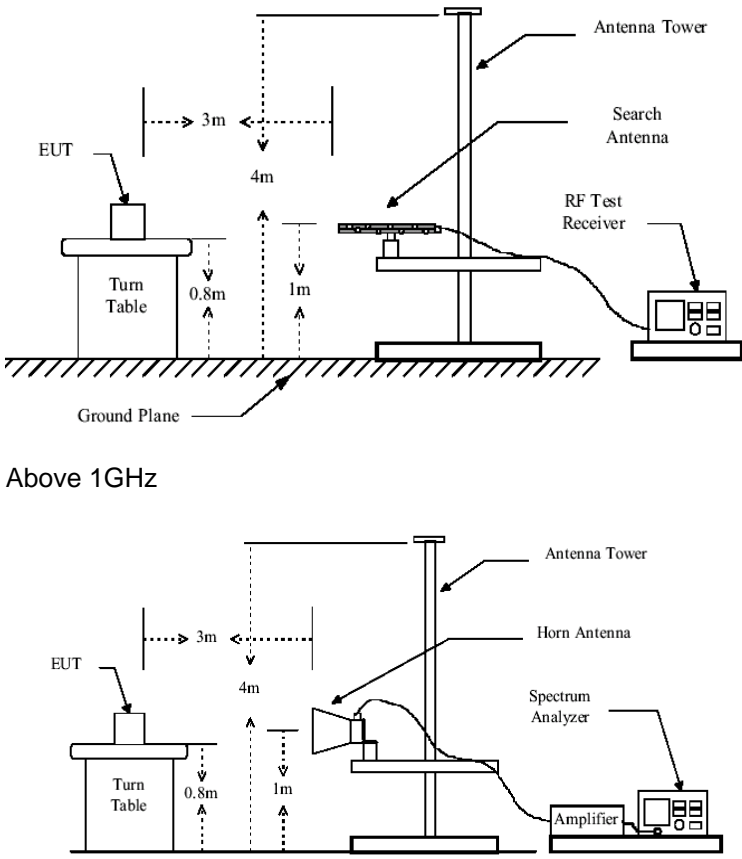
	Freq	Read Level	Cable Loss	LISN Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.204	40.24	0.13	0.07	40.44	63.45	-23.01	QP
2	0.204	33.88	0.13	0.07	34.08	53.45	-19.37	Average
3	0.476	48.67	0.11	0.06	48.84	56.41	-7.57	QP
4	0.476	38.61	0.11	0.06	38.78	46.41	-7.63	Average
5	0.880	43.87	0.13	0.07	44.07	56.00	-11.93	QP
6	0.880	33.64	0.13	0.07	33.84	46.00	-12.16	Average
7	1.197	40.36	0.13	0.08	40.57	56.00	-15.43	QP
8	1.197	29.70	0.13	0.08	29.91	46.00	-16.09	Average
9	1.970	40.15	0.14	0.09	40.38	56.00	-15.62	QP
10	1.970	27.94	0.14	0.09	28.17	46.00	-17.83	Average
11	3.107	40.31	0.15	0.12	40.58	56.00	-15.42	QP
12	3.107	26.08	0.15	0.12	26.35	46.00	-19.65	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.2 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109																								
Test Method:	ANSI C63.4:2009																								
Test Frequency Range:	30MHz to 6GHz																								
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																								
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr></table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value	
Frequency	Detector	RBW	VBW	Remark																					
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																					
Above 1GHz	Peak	1MHz	3MHz	Peak Value																					
	Peak	1MHz	10Hz	Average Value																					
Limit:	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.00</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.50</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.00</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.00</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr><tr><td>74.00</td><td>Peak Value</td></tr></table>					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.00	Quasi-peak Value	88MHz-216MHz	43.50	Quasi-peak Value	216MHz-960MHz	46.00	Quasi-peak Value	960MHz-1GHz	54.00	Quasi-peak Value	Above 1GHz	54.00	Average Value	74.00	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																							
30MHz-88MHz	40.00	Quasi-peak Value																							
88MHz-216MHz	43.50	Quasi-peak Value																							
216MHz-960MHz	46.00	Quasi-peak Value																							
960MHz-1GHz	54.00	Quasi-peak Value																							
Above 1GHz	54.00	Average Value																							
	74.00	Peak Value																							
Test Procedure:	<div>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</div> <div>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</div> <div>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</div>																								
Test setup:	Below 1GHz																								

	 <p>Above 1GHz</p>
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar
Measurement Record:	
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details. All of the listed mode were tested and found the "PC mode" is the worst case. Only the data of worst case is reported.
Test results:	Pass

Note:

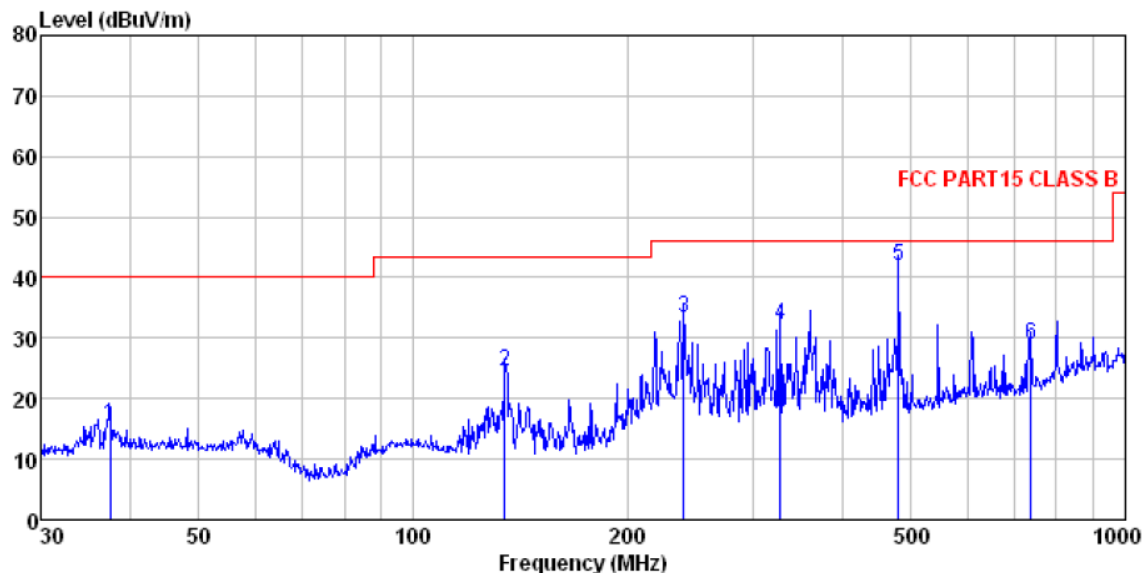
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

Measurement Data

Below 1GHz

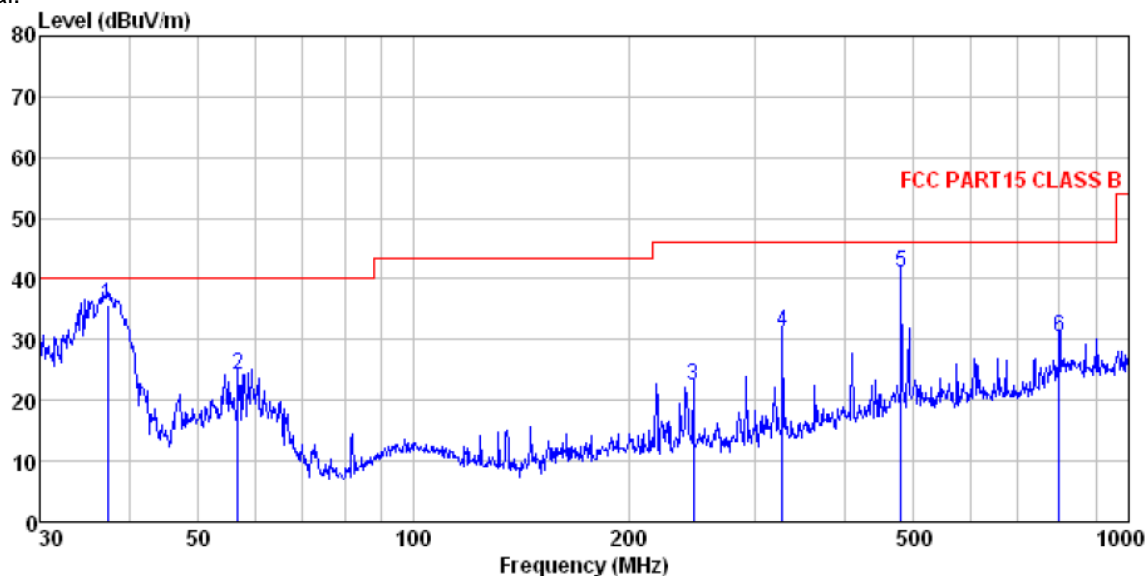
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL
 Job No. : 1144RF
 Test Mode : PC mode
 Test Engineer: Rong

	Freq	ReadAntenna	Cable Preamp		Limit	Over	
	Level	Factor	Loss Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	37.548	30.11	14.96	0.64	30.06	15.65	40.00 -24.35 QP
2	134.559	41.95	10.56	1.47	29.49	24.49	43.50 -19.01 QP
3	239.987	46.70	14.09	2.07	29.56	33.30	46.00 -12.70 QP
4	327.887	43.99	15.66	2.51	29.84	32.32	46.00 -13.68 QP
5	480.528	49.87	18.07	3.22	29.34	41.82	46.00 -4.18 QP
6	737.071	32.71	21.29	4.23	29.20	29.03	46.00 -16.97 QP

Vertical:

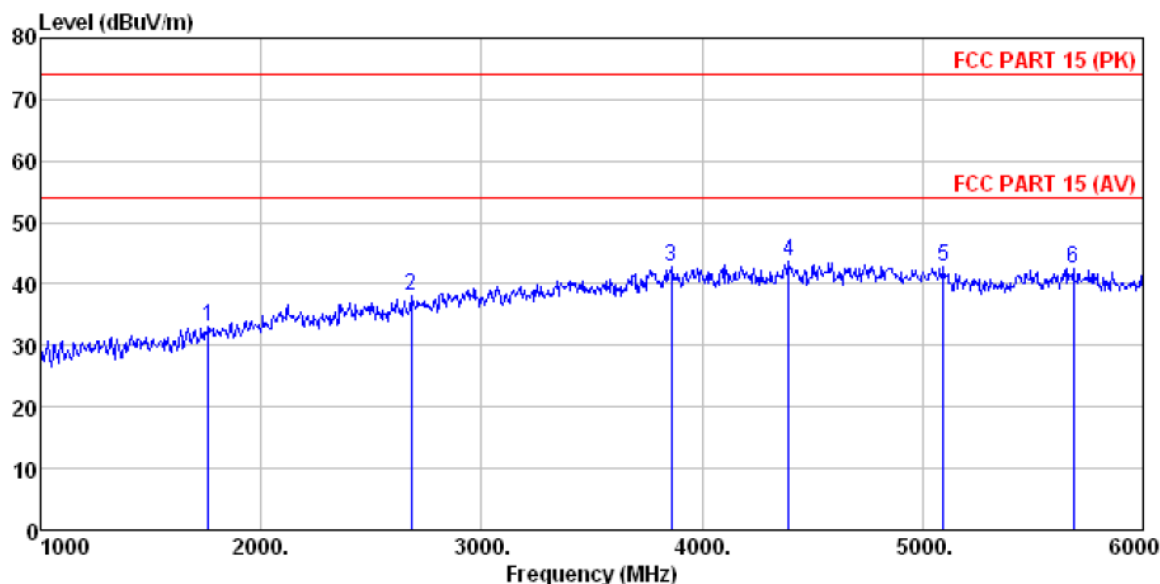


Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL
 Job No. : 1144RF
 Test Mode : PC mode
 Test Engineer: Rong

	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	37.285	50.37	14.92	0.63	30.06	35.86	40.00	-4.14 QP
2	56.792	38.29	14.89	0.83	29.94	24.07	40.00	-15.93 QP
3	245.951	35.90	14.08	2.10	29.61	22.47	46.00	-23.53 QP
4	327.887	42.86	15.66	2.51	29.84	31.19	46.00	-14.81 QP
5	480.528	49.12	18.07	3.22	29.34	41.07	46.00	-4.93 QP
6	798.980	33.15	22.06	4.45	29.20	30.46	46.00	-15.54 QP

Above 1GHz

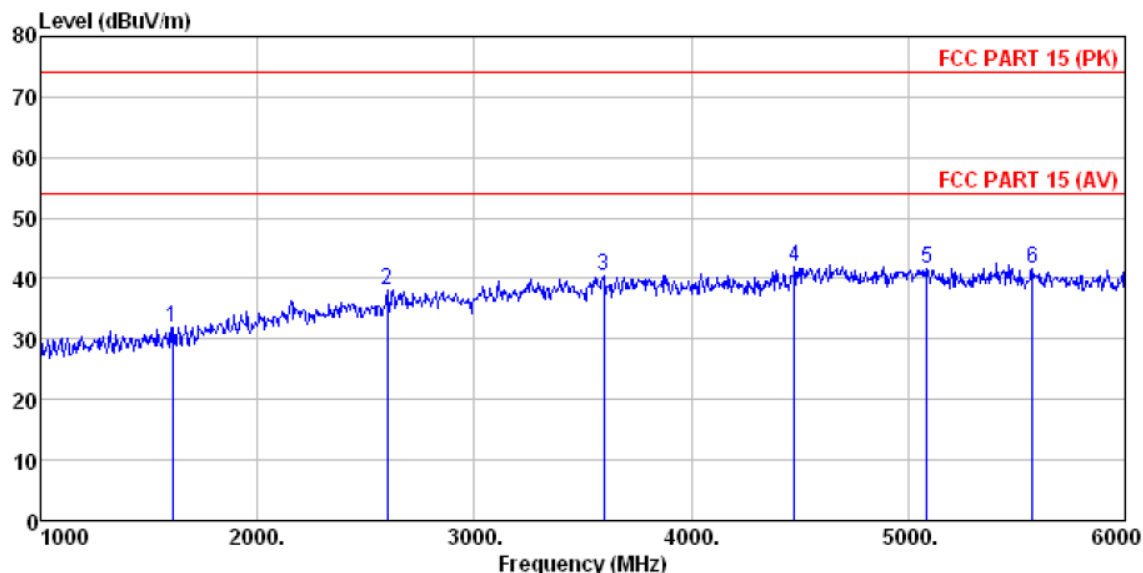
Horizontal:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
 Job No. : 1144RF
 Test Mode : PC mode
 Test Engineer: Rong

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
		Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1760.000	37.05	25.12	4.84	34.05	32.96	74.00	-41.04	Peak
2	2680.000	37.92	28.08	5.65	33.68	37.97	74.00	-36.03	Peak
3	3860.000	38.11	29.45	7.62	32.34	42.84	74.00	-31.16	Peak
4	4395.000	36.20	31.05	8.24	31.89	43.60	74.00	-30.40	Peak
5	5095.000	34.08	32.03	8.90	32.23	42.78	74.00	-31.22	Peak
6	5685.000	32.55	32.47	9.77	32.31	42.48	74.00	-31.52	Peak

Vertical:

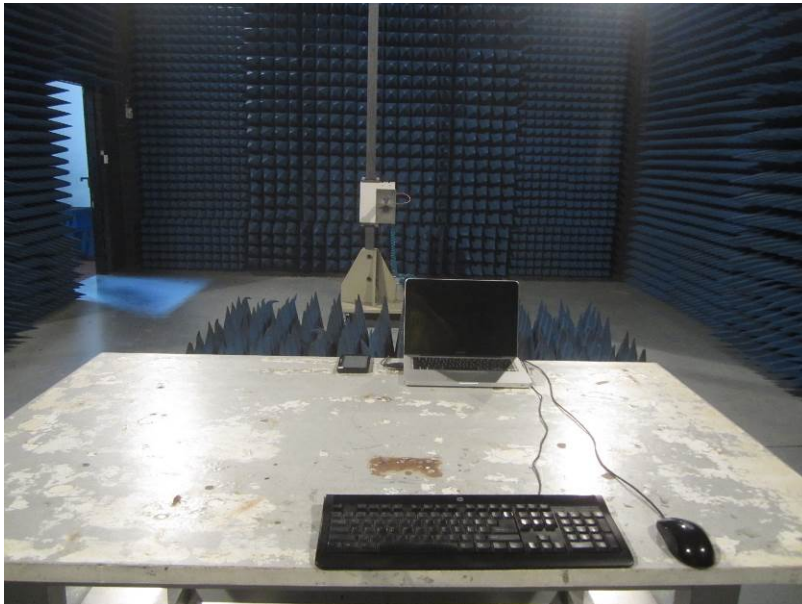
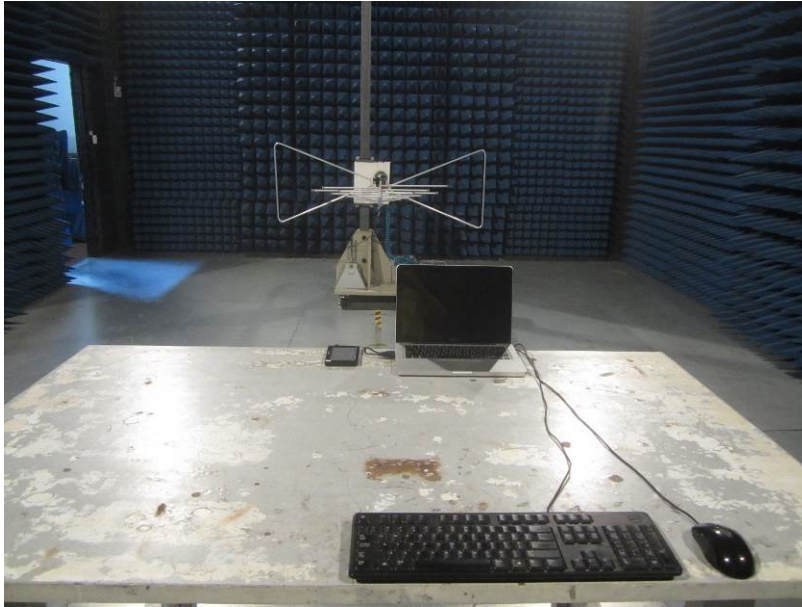


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
 Job No. : 1144RF
 Test Mode : PC mode
 Test Engineer: Rong

	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1610.000	35.89	24.96	4.75	33.79	31.81	74.00	-42.19 Peak
2	2600.000	38.43	27.80	5.58	33.78	38.03	74.00	-35.97 Peak
3	3595.000	36.71	29.13	7.15	32.64	40.35	74.00	-33.65 Peak
4	4475.000	34.33	31.29	8.31	31.92	42.01	74.00	-31.99 Peak
5	5085.000	32.85	32.02	8.90	32.22	41.55	74.00	-32.45 Peak
6	5575.000	32.20	32.18	9.61	32.39	41.60	74.00	-32.40 Peak

8 Test Setup Photo

Radiated Emission

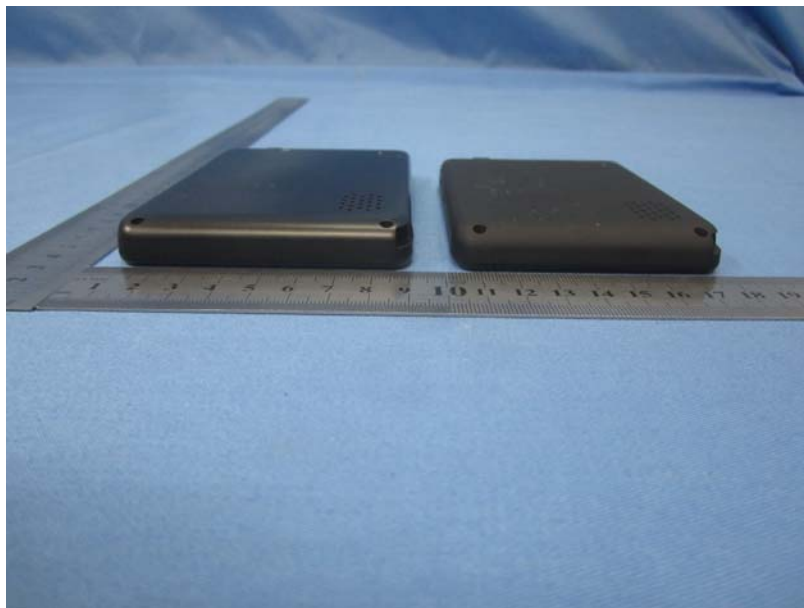


Conducted Emission



9 EUT Constructional Details





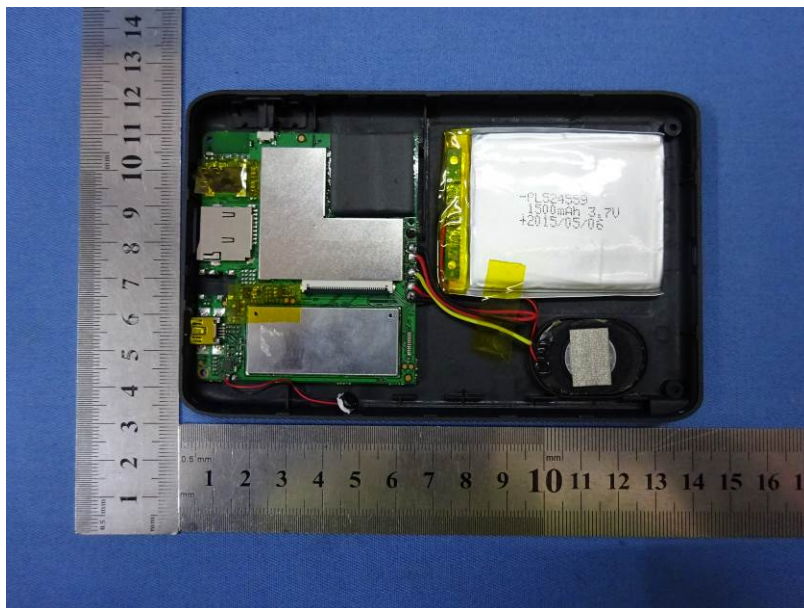


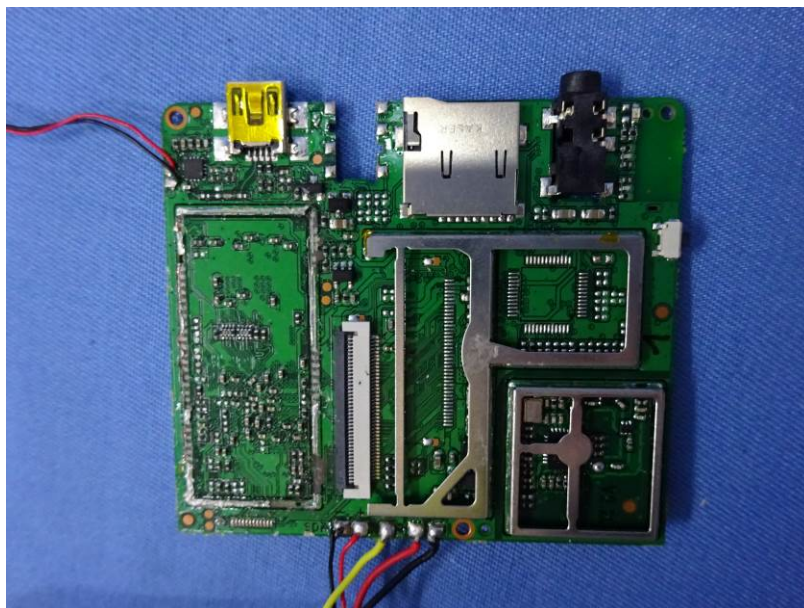
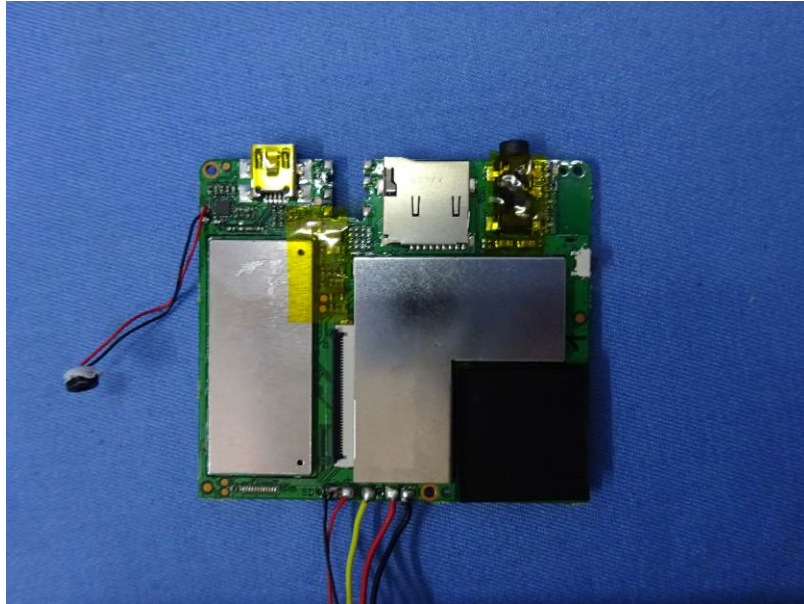


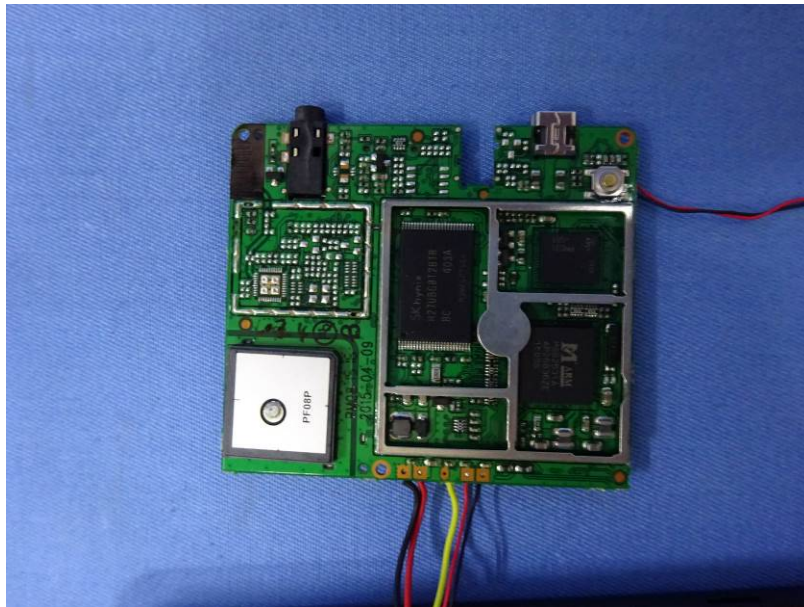


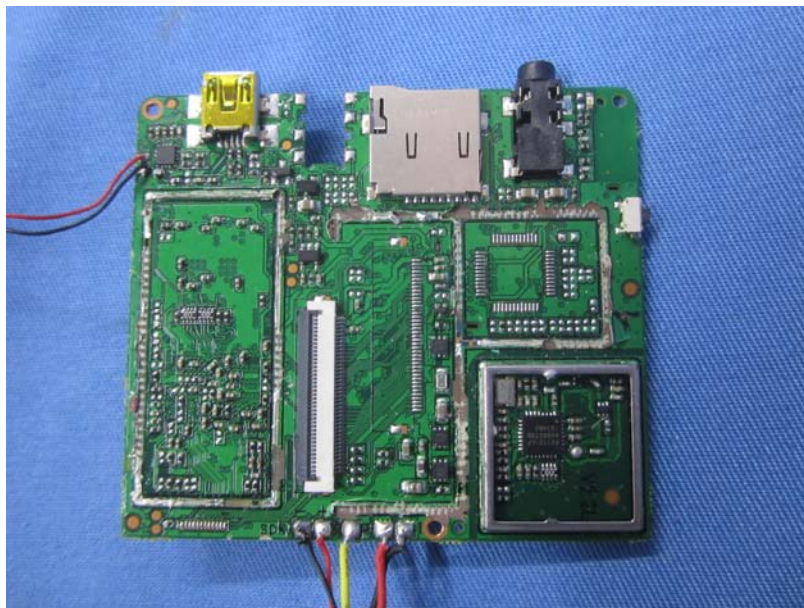
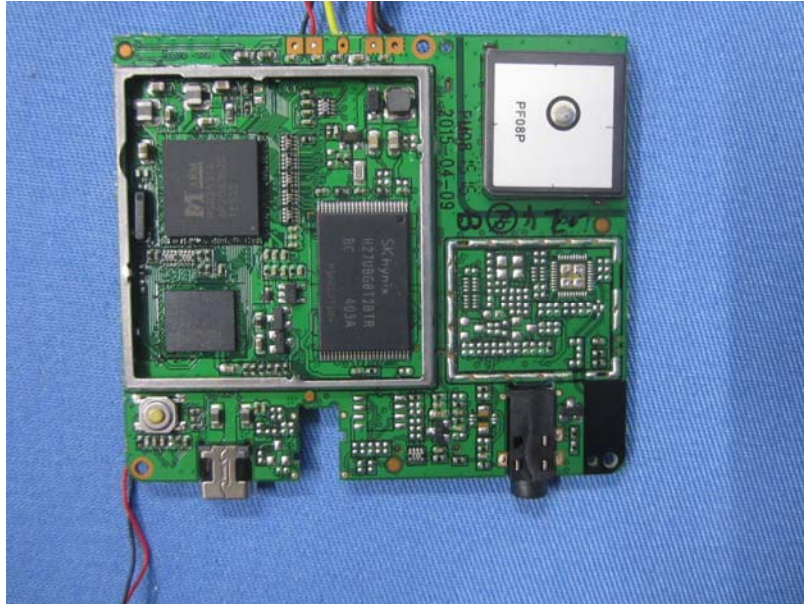














----- End-----