

TEST REPORT

Applicant: K-mark Industrial Limited.

Address of Applicant: Flat A, 7/F., Mai On Ind. Bldg., 17-21 Kung Yip Street, Kwai Chung, Hong Kong.

Equipment Under Test (EUT)

Product Name: Guardian

Model No.: PRU-GD1, PRU-GD1-ACC-S1

Trade Mark: 

FCC ID: VEPGL-GUARDIAN

Applicable standards: FCC CFR Title 47 Part 15 Subpart B:2013

Date of sample receipt: June 18, 2014

Date of Test: June 18-24, 2014

Date of report issue: June 24, 2014

Test Result : PASS *

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

Authorized Signature:



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	June 24, 2014	Original

Prepared By:

Edward Pan

Date:

April 03, 2014

Project Engineer

Check By:

Hans Hu

Date:

April 03, 2014

Reviewer

3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 TEST SUMMARY	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 RADIATED EMISSION.....	8
7.2 CONDUCTED EMISSIONS	14
8 TEST SETUP PHOTO	17
9 EUT CONSTRUCTIONAL DETAILS	19

4 Test Summary

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

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

5 General Information

5.1 Client Information

Applicant:	K-mark Industrial Limited.
Address of Applicant:	Flat A, 7/F., Mai On Ind. Bldg., 17-21 Kung Yip Street, Kwai Chung, Hong Kong.
Manufacturer:	K-mark Industrial Limited.
Address of Manufacturer	Flat A, 7/F., Mai On Ind. Bldg., 17-21 Kung Yip Street, Kwai Chung, Hong Kong.
Factory:	K-mark Industrial Limited.
Address of Factory:	Flat A, 7/F., Mai On Ind. Bldg., 17-21 Kung Yip Street, Kwai Chung, Hong Kong.

5.2 General Description of EUT

Product Name:	Guardian
Model No.:	PRU-GD1, PRU-GD1-ACC-S1
Operation Frequency:	434.0358MHz (Receiver)
Power supply:	Model No.:SAW-0900300 Input: AC 100-240V 50/60Hz 0.3A Output: DC 9V 300mA DC 9.0V (6 x 1.5V C Size battery)

5.3 Test mode

Receiving mode	Keep the EUT in Receiving mode.
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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.
 Address: 2nd Floor, Block No.2, 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
K-mark Industrial Limited.	BarkWise (Transmitter)	UBC-CO1-ACC-R1	N/A	FCC ID: VEPUBC-CO1-ACC-R1

5.7 Deviation from Standards

None.

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	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 28 2014	Mar. 27 2015
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 05 2013	Dec. 04 2014
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 02 2013	Jul. 01 2014
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 23 2014	Feb. 22 2015
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 28 2013	June 27 2014
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 28 2014	Mar. 27 2015
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 29 2014	Mar. 28 2015
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 29 2014	Mar. 28 2015
11	Coaxial cable	GTS	N/A	GTS210	Mar. 29 2014	Mar. 28 2015
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 29 2014	Mar. 28 2015
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 02 2013	Jul. 01 2014
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 02 2013	Jul. 01 2014
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 28 2013	June 27 2014

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	Sep. 07 2013	Sep. 06 2014
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 02 2013	Jul. 01 2014
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 02 2013	Jul. 01 2014
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 02 2013	Jul. 01 2014
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jul. 02 2013	Jul. 01 2014
6	Coaxial Cable	GTS	N/A	GTS227	Jul. 02 2013	Jul. 01 2014
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 (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 09 2013	July 08 2014

7 Test Results and Measurement Data

7.1 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109																							
Test Method:	ANSI C63.4:2003																							
Test Frequency Range:	30MHz to 2GHz																							
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																							
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <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>AV</td> <td>1MHz</td> <td>3MHz</td> <td>Average Value</td> </tr> </tbody> </table>				Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	AV	1MHz	3MHz	Average Value	
Frequency	Detector	RBW	VBW	Remark																				
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																				
Above 1GHz	Peak	1MHz	3MHz	Peak Value																				
	AV	1MHz	3MHz	Average Value																				
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Remark</th> </tr> </thead> <tbody> <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> </tbody> </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:	<ol style="list-style-type: none"> 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. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 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. 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. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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. 																							
Test setup:	Below 1GHz																							

	<p>Above 1GHz</p>
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar
Measurement Record:	Uncertainty: ± 4.5dB
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Note:

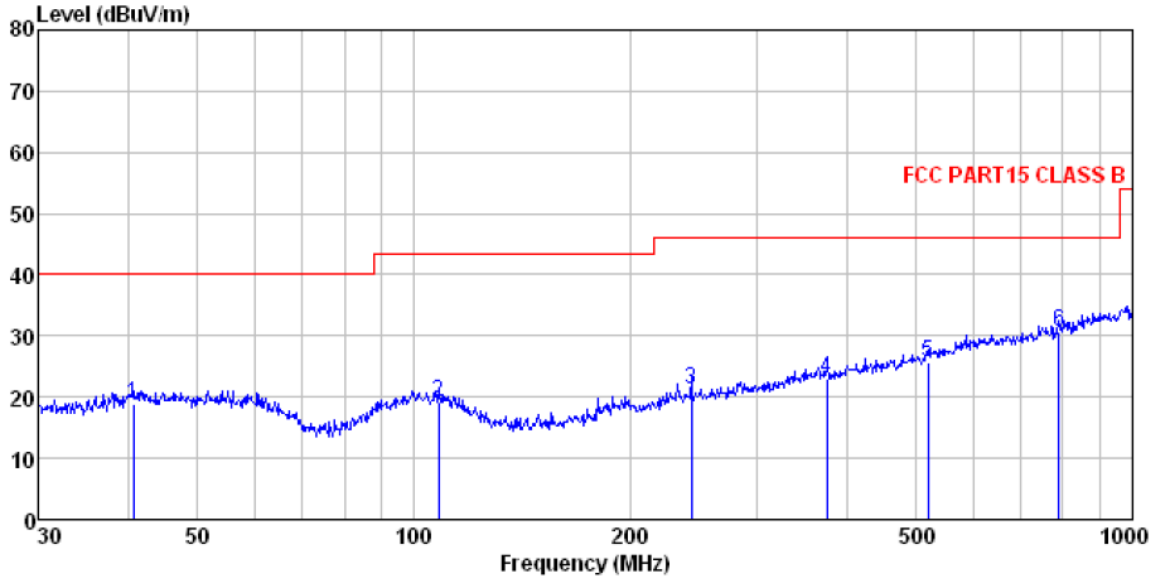
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

Measurement Data

Below 1GHz

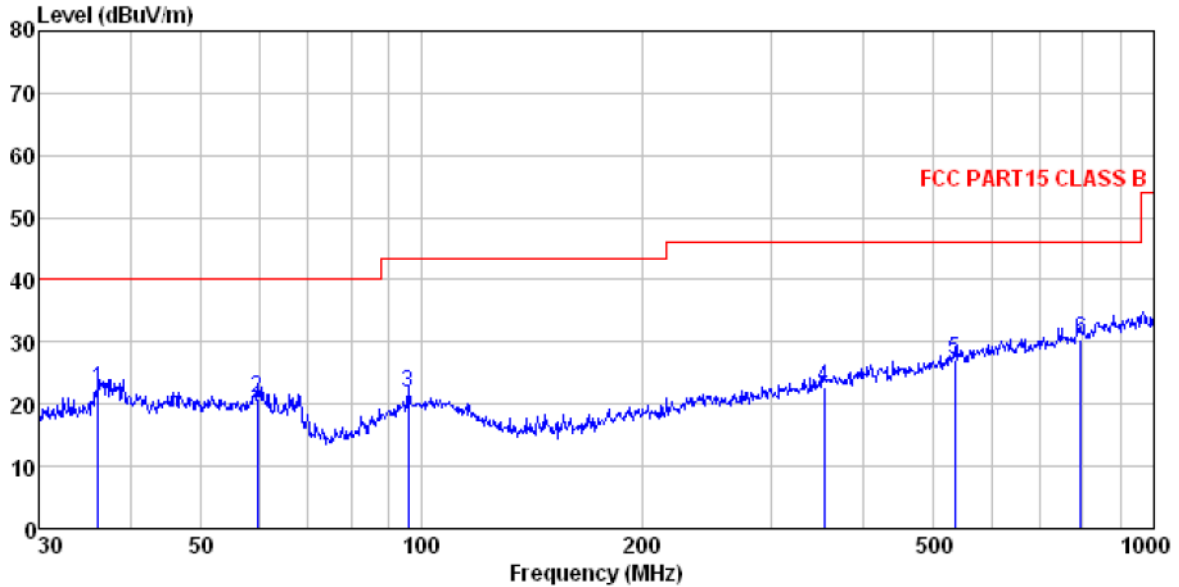
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL
 Job No. : 1012RF
 Test Mode : Receiving mode
 Test Engineer: Yang

	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	40.702	34.83	15.58	0.67	32.05	19.03	40.00	-20.97 QP
2	108.267	35.23	14.39	1.26	31.80	19.08	43.50	-24.42 QP
3	243.377	37.27	14.08	2.09	32.16	21.28	46.00	-24.72 QP
4	375.939	35.72	16.56	2.75	31.95	23.08	46.00	-22.92 QP
5	519.065	34.75	19.00	3.39	31.46	25.68	46.00	-20.32 QP
6	790.619	35.51	21.96	4.42	31.31	30.58	46.00	-15.42 QP

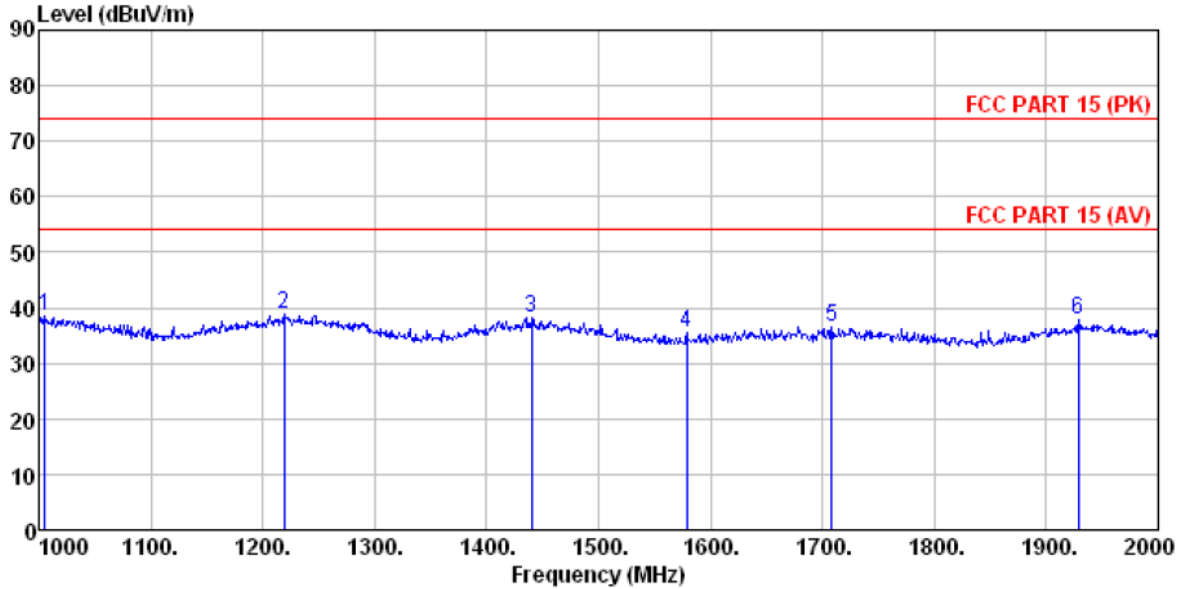
Vertical:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL
 Job No. : 1012RF
 Test Mode : Receiving mode
 Test Engineer: Yang

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
	MHz	Level	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB
1	36.127	39.33	14.63	0.62	32.06	22.52	40.00 -17.48 QP
2	59.649	37.43	14.73	0.86	31.94	21.08	40.00 -18.92 QP
3	95.762	37.66	14.90	1.16	31.74	21.98	43.50 -21.52 QP
4	354.183	35.72	16.33	2.64	32.02	22.67	46.00 -23.33 QP
5	533.832	35.74	19.26	3.46	31.38	27.08	46.00 -18.92 QP
6	793.396	35.44	21.96	4.43	31.31	30.52	46.00 -15.48 QP

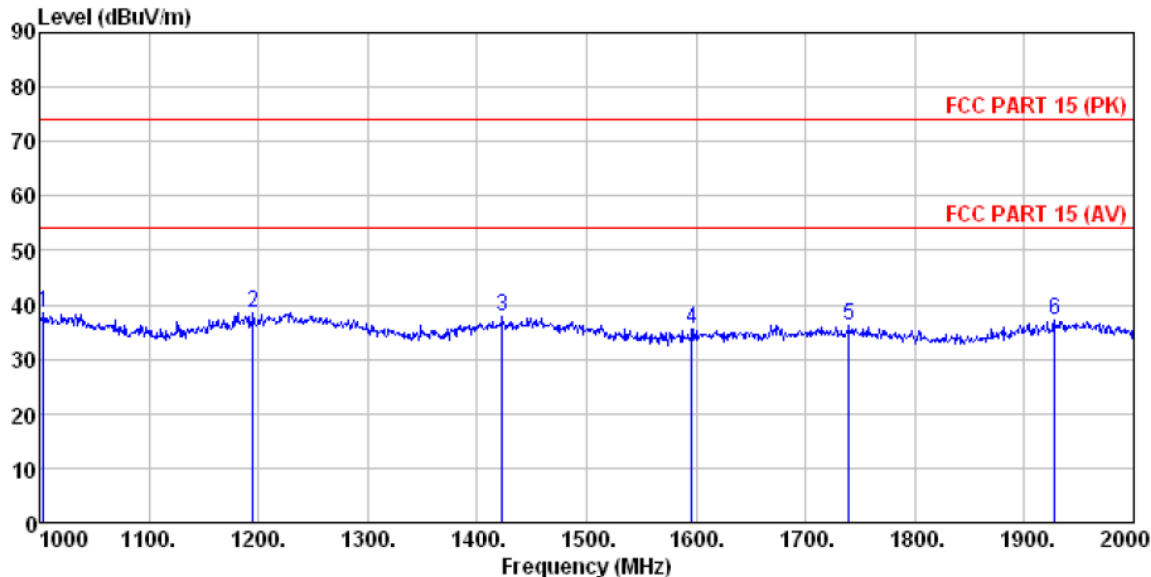
Above 1GHz
Horizontal:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
 Job No. : 1012RF
 Test Mode : Receiving mode
 Test Engineer: Yang

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
	MHz	Level	Factor	Loss	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	1005.000	42.36	24.53	4.30	32.75	38.44	74.00 -35.56 Peak
2	1219.000	42.05	25.43	4.48	33.13	38.83	74.00 -35.17 Peak
3	1440.000	41.56	25.38	4.64	33.50	38.08	74.00 -35.92 Peak
4	1579.000	39.47	25.01	4.73	33.74	35.47	74.00 -38.53 Peak
5	1708.000	40.67	24.99	4.81	33.97	36.50	74.00 -37.50 Peak
6	1929.000	41.33	25.86	4.92	34.34	37.77	74.00 -36.23 Peak

Vertical:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
 Job No. : 1012RF
 Test Mode : Receiving mode
 Test Engineer: Yang

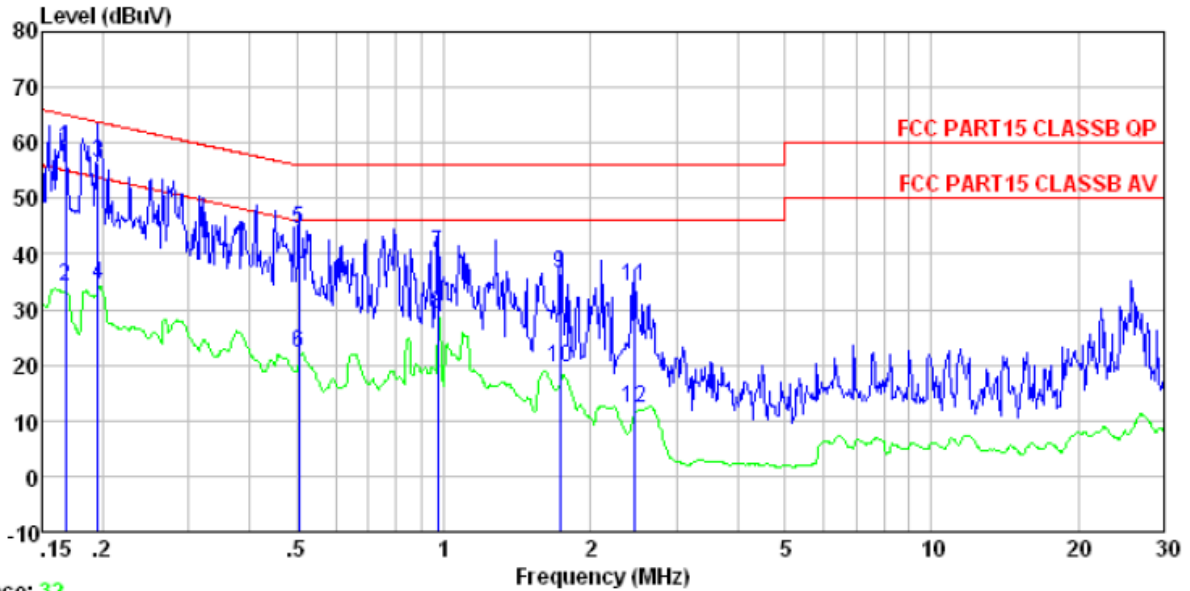
	ReadAntenna	Cable	Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line			
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m			
1	1004.000	42.47	24.53	4.29	32.75	38.54	74.00	-35.46	Peak
2	1195.000	41.95	25.33	4.46	33.07	38.67	74.00	-35.33	Peak
3	1423.000	41.35	25.47	4.63	33.47	37.98	74.00	-36.02	Peak
4	1596.000	39.61	24.99	4.74	33.76	35.58	74.00	-38.42	Peak
5	1740.000	40.49	25.05	4.83	34.03	36.34	74.00	-37.66	Peak
6	1928.000	40.91	25.86	4.92	34.34	37.35	74.00	-36.65	Peak

7.2 Conducted Emissions

Test Requirement:	FCC Part15 B Section 15.107														
Test Method:	ANSI C63.4:2003														
Test Frequency Range:	150KHz to 30MHz														
Class / Severity:	Class B														
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto														
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <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> </tbody> </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:	<p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are 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. 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). 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: 2003 on conducted measurement. 														
Test Instruments:	Refer to section 6 for details														
Test mode:	Refer to section 5.3 for details														
Test results:	Pass														

Measurement Data

Line:

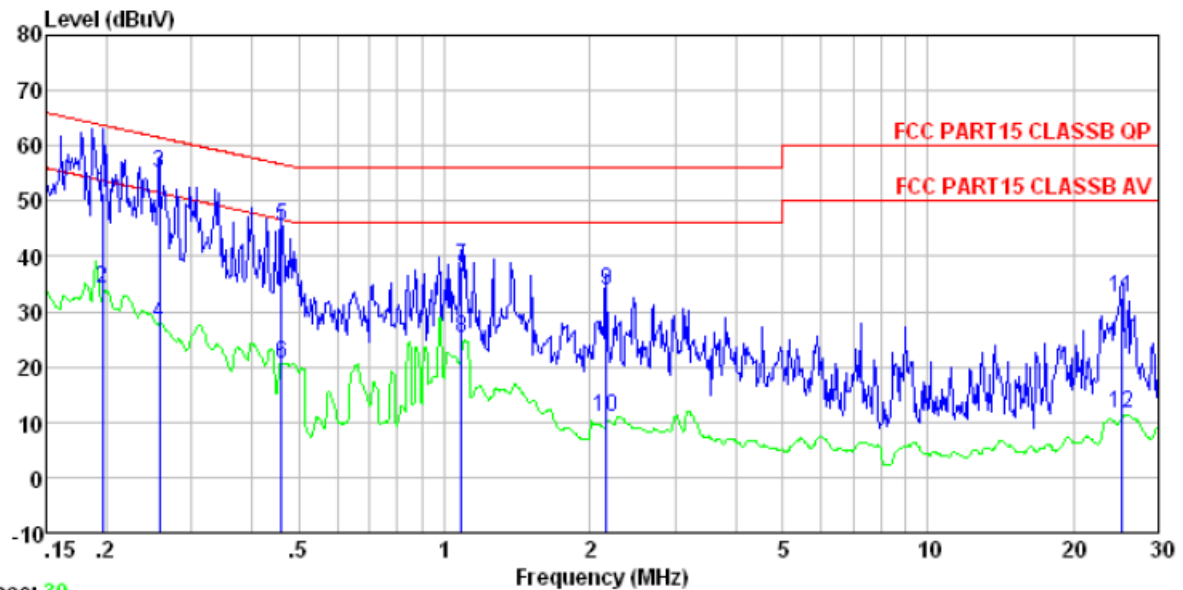


Trace: 32

Condition : FCC PART15 CLASSB QP LISN-2013 LINE
 Job No. : 1012RF
 Test mode : Operation mode
 Test Engineer: Mike

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.168	58.78	0.15	0.12	59.05	65.08	-6.03	QP
2	0.168	33.78	0.15	0.12	34.05	55.08	-21.03	Average
3	0.195	56.00	0.14	0.13	56.27	63.80	-7.53	QP
4	0.195	34.14	0.14	0.13	34.41	53.80	-19.39	Average
5	0.505	44.08	0.12	0.11	44.31	56.00	-11.69	QP
6	0.505	22.08	0.12	0.11	22.31	46.00	-23.69	Average
7	0.974	39.95	0.14	0.13	40.22	56.00	-15.78	QP
8	0.974	28.95	0.14	0.13	29.22	46.00	-16.78	Average
9	1.734	36.35	0.12	0.14	36.61	56.00	-19.39	QP
10	1.734	19.35	0.12	0.14	19.61	46.00	-26.39	Average
11	2.461	33.85	0.13	0.15	34.13	56.00	-21.87	QP
12	2.461	11.85	0.13	0.15	12.13	46.00	-33.87	Average

Neutral:



Trace: 30
 Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 1012RF
 Test mode : Operation mode
 Test Engineer: Mike

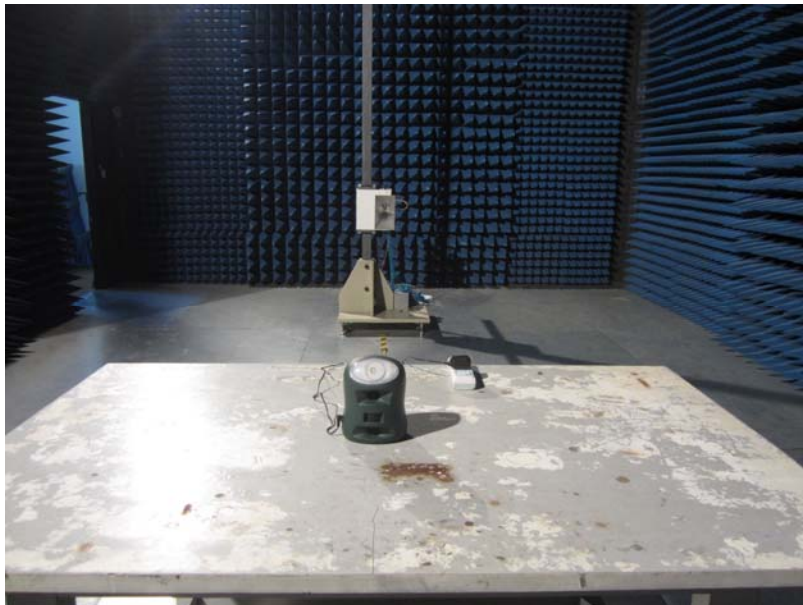
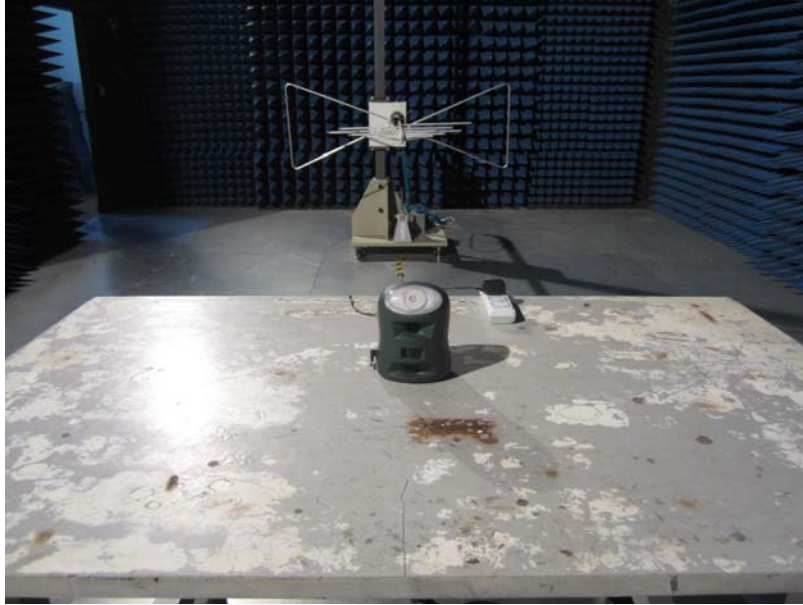
	Read Freq	Level	LISN Factor	Cable Loss	Level	Limit	Over	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.197	51.20	0.07	0.13	51.40	63.76	-12.36	QP
2	0.197	33.82	0.07	0.13	34.02	53.76	-19.74	Average
3	0.258	54.81	0.06	0.11	54.98	61.51	-6.53	QP
4	0.258	27.81	0.06	0.11	27.98	51.51	-23.53	Average
5	0.461	45.24	0.06	0.11	45.41	56.67	-11.26	QP
6	0.461	20.24	0.06	0.11	20.41	46.67	-26.26	Average
7	1.082	38.06	0.08	0.13	38.27	56.00	-17.73	QP
8	1.082	25.06	0.08	0.13	25.27	46.00	-20.73	Average
9	2.167	33.56	0.09	0.15	33.80	56.00	-22.20	QP
10	2.167	10.56	0.09	0.15	10.80	46.00	-35.20	Average
11	25.188	31.22	1.05	0.23	32.50	60.00	-27.50	QP
12	25.188	10.22	1.05	0.23	11.50	50.00	-38.50	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

8 Test Setup Photo

Radiated Emission



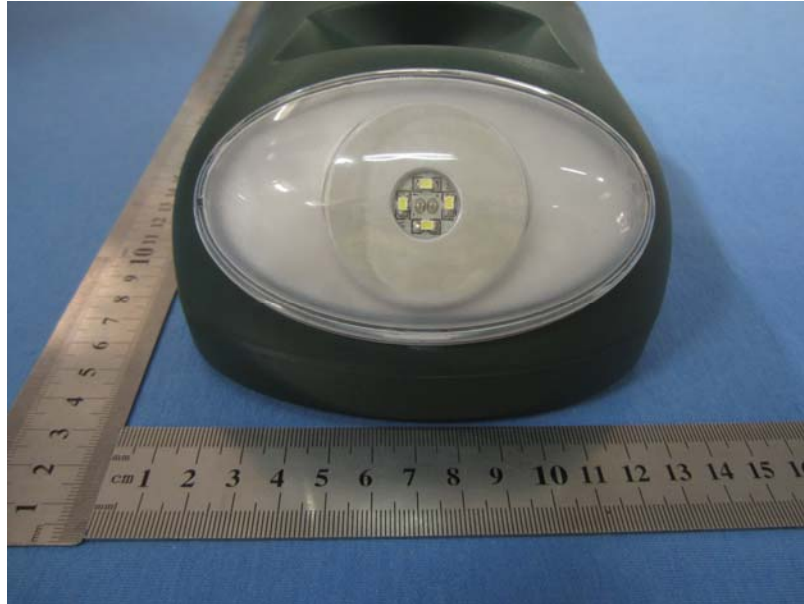
Conducted Emissions



9 EUT Constructional Details

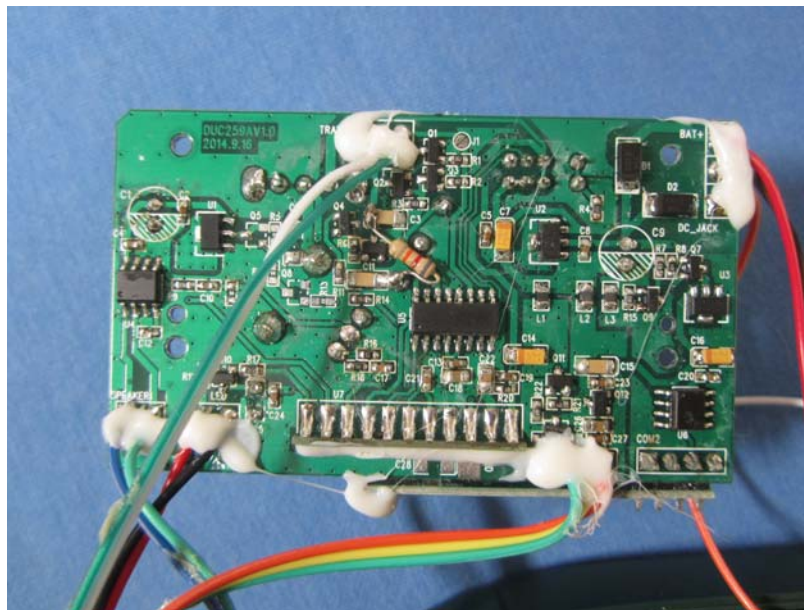


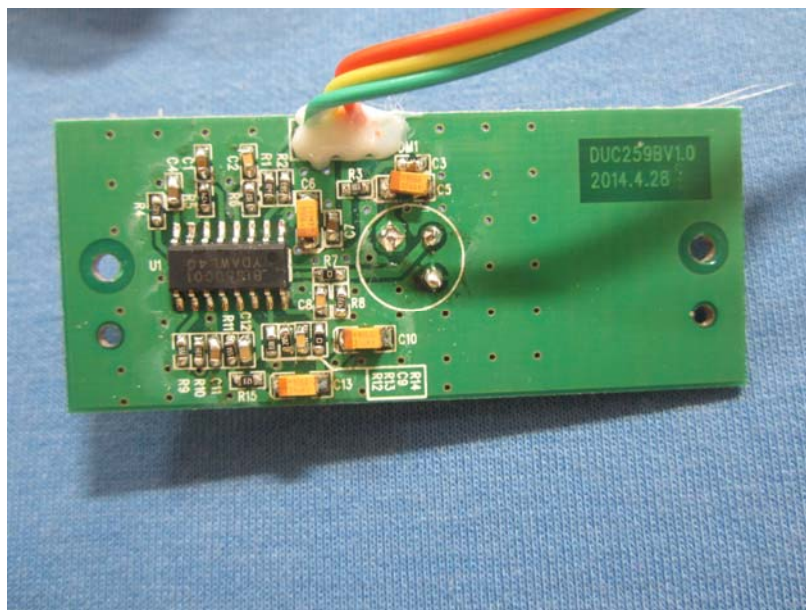
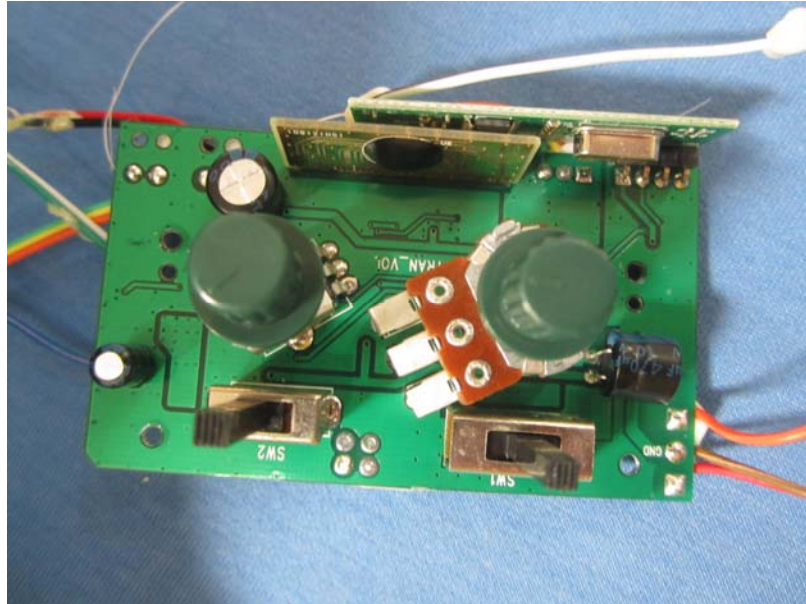


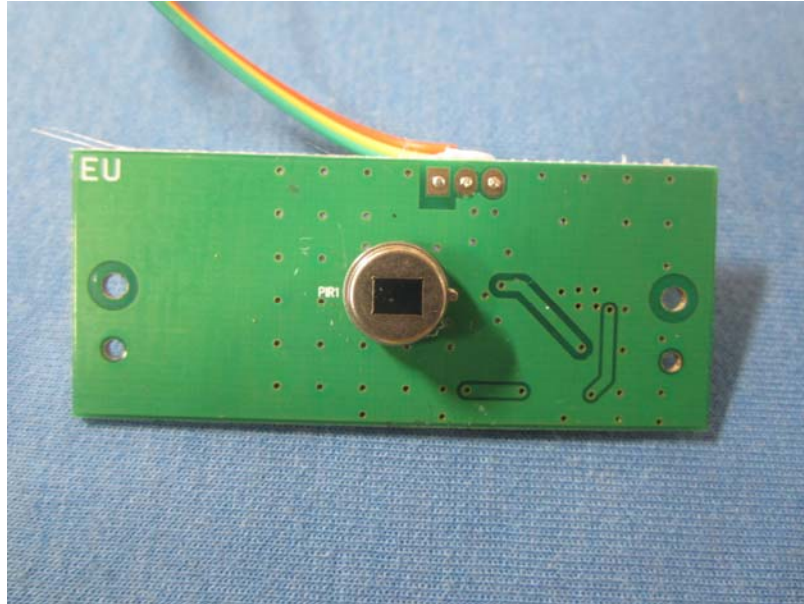


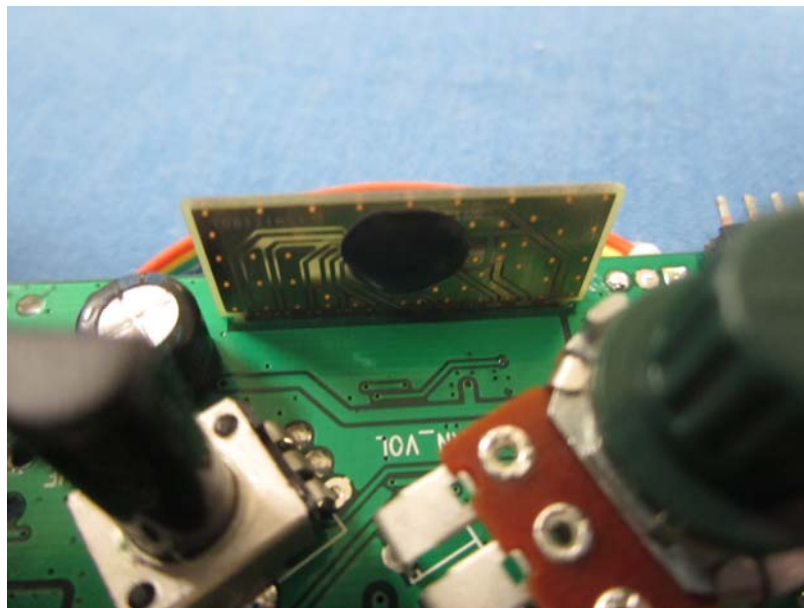
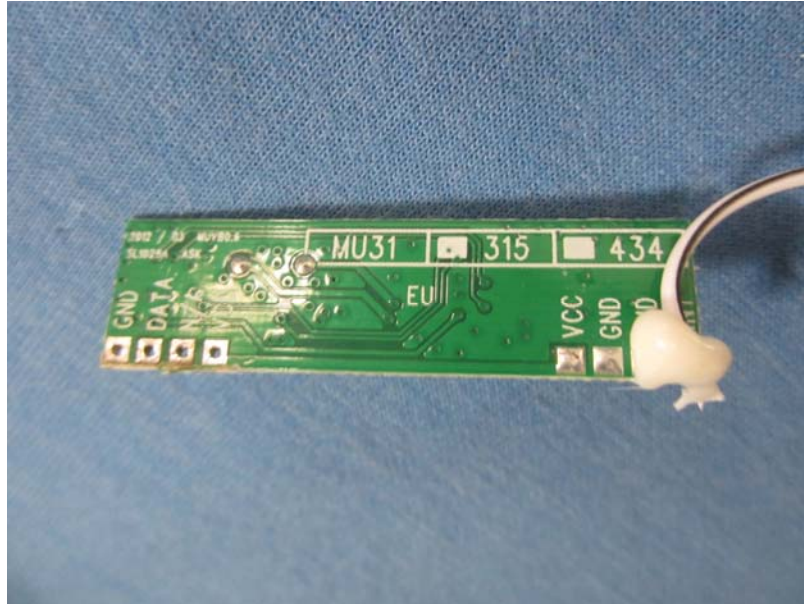


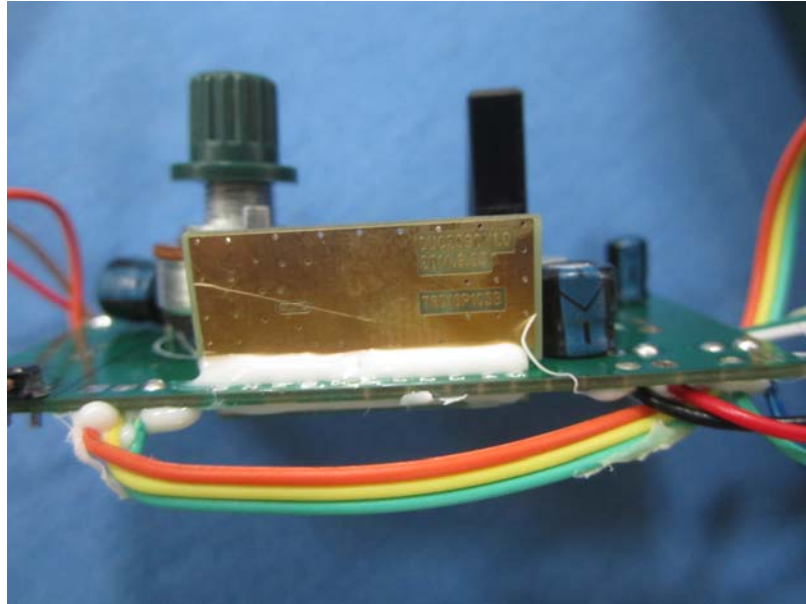












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