

# FCC TEST REPORT

**Product** : Scalextric ARC Hand Controller  
**Trade mark** : Scalextric®  
**Model/Type reference** : SSA-00189, SSA-00190  
**Serial Number** : N/A  
**Report Number** : EED32H001228-2  
**FCC ID** : 2ACUF-SSA00189  
**Date of Issue** : Sep. 24, 2015  
**Test Standards** : 47 CFR Part 15 Subpart C (2014)  
**Test result** : PASS

Prepared for:

**Hornby Hobbies Ltd.**

**Enterprise Road, Westwood Industrial Estate, CT9 4JX,  
United Kingdom**

Prepared by:

**Centre Testing International Group Co., Ltd.  
Hongwei Industrial Zone, Bao'an 70 District,  
Shenzhen, Guangdong, China**

**TEL: +86-755-3368 3668**

**FAX: +86-755-3368 3385**

Tested by:

*Ware Xin*

Reviewed by:

*Emen - Li*

Approved by:

*Sheek Luo*

Date:

Sep. 24, 2015

Sheek Luo

Lab supervisor

Check No.: 1022503909



## 2 Version

Version No.	Date	Description
00	Sep. 24, 2015	Original

### 3 Test Summary

Test Item	Test Requirement	Test method	Result
<b>Antenna Requirement</b>	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS
<b>AC Power Line Conducted Emission</b>	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	N/A
<b>Field Strength of the Fundamental Signal</b>	47 CFR Part 15 Subpart C Section 15.249 (a)	ANSI C63.10-2013	PASS
<b>Spurious Emissions</b>	47 CFR Part 15 Subpart C Section 15.249 (a)/15.209	ANSI C63.10-2013	PASS
<b>Restricted bands around fundamental frequency (Radiated Emission)</b>	47 CFR Part 15 Subpart C Section 15.249(a)/15.205	ANSI C63.10-2013	PASS
<b>20dB Occupied Bandwidth</b>	47 CFR Part 15 Subpart C Section 15.215 (c)	ANSI C63.10-2013	PASS

**Remark:**

The tested sample(s) and the sample information are provided by the client.

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

Model No.: SSA-00189, SSA-00190

All models are identical except the outward appearance. The test model is SSA-00189 and the test results are applicable to the others.

## 4 Contents

	Page
<b>1 COVER PAGE.....</b>	<b>1</b>
<b>2 VERSION.....</b>	<b>2</b>
<b>3 TEST SUMMARY.....</b>	<b>3</b>
<b>4 CONTENTS.....</b>	<b>4</b>
<b>5 GENERAL INFORMATION.....</b>	<b>5</b>
5.1 CLIENT INFORMATION.....	5
5.2 GENERAL DESCRIPTION OF EUT.....	5
5.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD.....	5
5.4 TEST ENVIRONMENT AND MODE.....	6
5.5 DESCRIPTION OF SUPPORT UNITS.....	6
5.6 TEST LOCATION.....	6
5.7 TEST FACILITY.....	6
5.8 DEVIATION FROM STANDARDS.....	7
5.9 ABNORMALITIES FROM STANDARD CONDITIONS.....	7
5.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	7
5.11 MEASUREMENT UNCERTAINTY (95% CONFIDENCE LEVELS, K=2).....	7
<b>6 EQUIPMENT LIST.....</b>	<b>8</b>
<b>7 TEST RESULTS AND MEASUREMENT DATA.....</b>	<b>10</b>
7.1 ANTENNA REQUIREMENT.....	10
7.2 RADIATED SPURIOUS EMISSION.....	11
7.3 RESTRICTED BANDS AROUND FUNDAMENTAL FREQUENCY.....	17
7.4 20DB BANDWIDTH.....	19
<b>APPENDIX 1 PHOTOGRAPHS OF TEST SETUP.....</b>	<b>21</b>
<b>APPENDIX 2 PHOTOGRAPHS OF EUT.....</b>	<b>22</b>

## 5 General Information

### 5.1 Client Information

Applicant:	Hornby Hobbies Ltd.
Address of Applicant:	Enterprise Road, Westwood Industrial Estate, CT9 4JX, United Kingdom
Manufacturer:	The Refined Industry Co., Ltd.
Address of Manufacturer:	7/F., Sun King Factory Building, 1-7, shing chuen Road, Shatin, N.T. Hong Kong.

### 5.2 General Description of EUT

Product Name:	Scalextric ARC Hand Controller
Model No.(EUT):	SSA-00189, SSA-00190
Trade Mark:	Scalextric®
EUT Supports Radios application:	2.4GHz
Power Supply:	Remote: 2*1.5(AA)=3.0V

### 5.3 Product Specification subjective to this standard

Carrier Frequency:	2402MHz-2480MHz						
Modulation Type:	GFSK						
Number of Channel:	40						
Test Software of EUT:	NORDIC(manufacturer declare )						
Antenna Gain:	0dBi						
Antenna Type:	Integral						
Sample Received Date:	Sep. 01, 2015						
Sample tested Date:	Sep. 01, 2015 to Sep. 23, 2015						
Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
3	2406MHz	13	2426MHz	23	2446MHz	33	2466MHz
4	2408MHz	14	2428MHz	24	2448MHz	34	2468MHz
5	2410MHz	15	2430MHz	25	2450MHz	35	2470MHz
6	2412MHz	16	2432MHz	26	2452MHz	36	2472MHz
7	2414MHz	17	2434MHz	27	2454MHz	37	2474MHz
8	2416MHz	18	2436MHz	28	2456MHz	38	2476MHz
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz



## 5.4 Test Environment and Mode

<b>Operating Environment:</b>	
Temperature:	24 °C
Humidity:	52 % RH
Atmospheric Pressure:	1008mbar
Remark: New battery is used during all test.	
<b>Test mode:</b>	
Remote TX:	The EUT transmitted the continuous modulation test signal at the specific channel(s).

## 5.5 Description of Support Units

The EUT has been tested independently.

## 5.6 Test Location

*All tests were performed at:*

*Centre Testing International Group Co., Ltd.*

*Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101*

*Telephone: +86 (0) 755 3368 3668 Fax: +86 (0) 755 3368 3385*

*No tests were sub-contracted.*

## 5.7 Test Facility

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

### **CNAS-Lab Code: L1910**

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories..

### **A2LA-Lab Cert. No. 3061.01**

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### **FCC-Registration No.: 565659**

Centre Testing International Group Co., Ltd. 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 565659.

### **IC-Registration No.: 7408A**

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A .

### **IC-Registration No.: 7408B**

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B.

**NEMKO-Aut. No.: ELA503**

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

**VCCI**

The Radiation 3 & 10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

## 5.8 Deviation from Standards

None.

## 5.9 Abnormalities from Standard Conditions

None.

## 5.10 Other Information Requested by the Customer

None.

## 5.11 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	$7.9 \times 10^{-8}$
2	RF power, conducted	0.31dB (30MHz-1GHz)
		0.57dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-12.75GHz)
4	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	2.8%
7	DC power voltages	0.025%

## 6 Equipment List

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber	TDK	SAC-3	---	06-02-2013	06-01-2016
TRILOG Broadband Antenna	schwarzbeck	VULB9163	9163-617	07-31-2015	07-29-2016
Microwave Preamplifier	Agilent	8449B	3008A02425	02-05-2015	02-04-2016
Horn Antenna	ETS-LINDGREN	3117	00057410	06-30-2015	06-28-2018
Loop Antenna	ETS	6502	00071730	07-30-2015	07-28-2017
Spectrum Analyzer	R&S	FSP40	100416	06-30-2015	06-28-2016
Receiver	R&S	ESCI	100435	06-30-2015	06-28-2016
Multi device Controller	maturio	NCD/070/10711112	---	01-13-2015	01-12-2016
LISN	schwarzbeck	NNBM8125	81251547	06-30-2015	06-28-2016
LISN	schwarzbeck	NNBM8125	81251548	06-30-2015	06-28-2016
Signal Generator	Agilent	E4438C	MY45095744	04-19-2015	04-18-2016
Signal Generator	Keysight	E8257D	MY53401106	04-14-2015	04-13-2016
Temperature/Humi dity Indicator	TAYLOR	1451	5190	07-09-2015	07-08-2016
Communication test set	Agilent	E5515C	GB47050533	01-13-2015	01-12-2016
Cable line	Fulai(7M)	SF106	5219/6A	01-13-2015	01-12-2016
Cable line	Fulai(6M)	SF106	5220/6A	01-13-2015	01-12-2016
Cable line	Fulai(3M)	SF106	5216/6A	01-13-2015	01-12-2016
Cable line	Fulai(3M)	SF106	5217/6A	01-13-2015	01-12-2016
Communication test set	R&S	CMW500	152394	04-19-2015	04-18-2016
High-pass filter(3- 18GHz)	Sinoscite	FL3CX03WG18NM 12-0398-002	---	01-13-2015	01-12-2016
High-pass filter(5- 18GHz)	MICRO- TRONICS	SPA-F-63029-4	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX01CA09CL1 2-0395-001	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX01CA08CL1 2-0393-001	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX02CA04CL1 2-0396-002	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX02CA03CL1 2-0394-001	---	01-13-2015	01-12-2016



Conducted RF test					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Spectrum Analyzer	R&S	FSP40	100416	06-30-2015	06-28-2016
Receiver	R&S	ESCI	100435	06-30-2015	06-28-2016
Noise generator	Beijing damping jidian	DM1661	126001	04-01-2015	03-31-2016
Attenuator	HuaXiang	INMET64671	INMET64671	04-01-2015	03-31-2016
Signal Generator	Agilent	E4438C	MY45095744	04-19-2015	04-18-2016
Attenuator	HuaXiang	SHX370	15040701	04-01-2015	03-31-2016
Signal Generator	Keysight	E8257D	MY53401106	04-14-2015	04-13-2016
High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-13-2015	01-12-2016
High-pass filter(5-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX01CA09C L12-0395-001	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX01CA08C L12-0393-001	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX02CA04C L12-0396-002	---	01-13-2015	01-12-2016

## 7 Test results and Measurement Data

### 7.1 Antenna Requirement

**Standard requirement:**

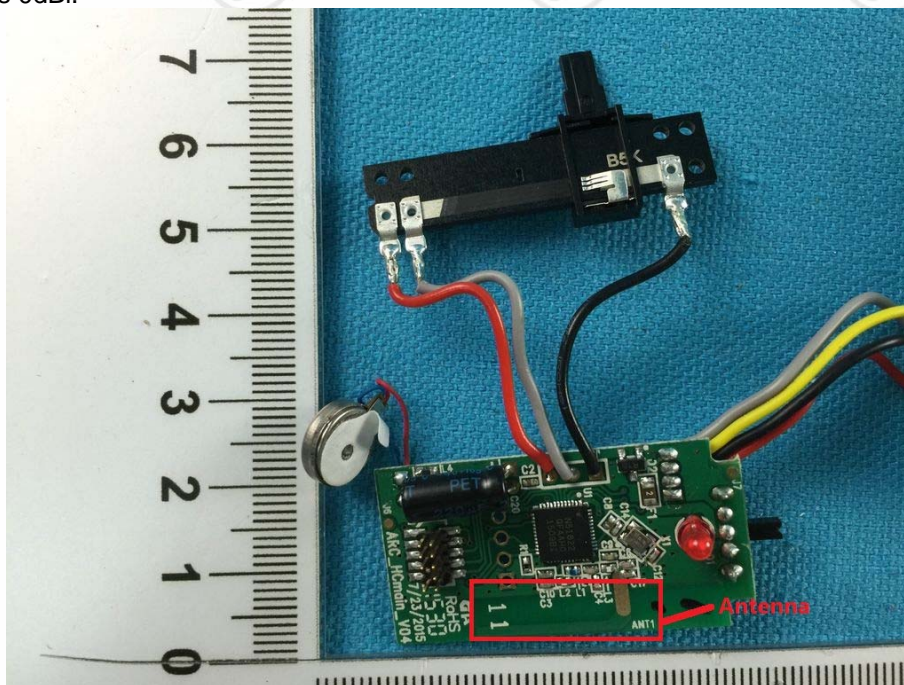
47 CFR Part 15C Section 15.203

15.203 requirement:

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.

**EUT Antenna:**

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.



## 7.2 Radiated Spurious Emission

**Test Requirement:** 47 CFR Part 15C Section 15.249 and 15.209

**Test Method:** ANSI C63.10

**Test Site:** Measurement Distance: 3m (Semi-Anechoic Chamber)

### Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

### Test Setup:

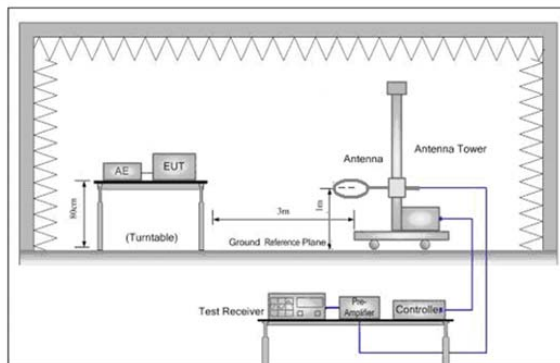


Figure 1. Below 30MHz

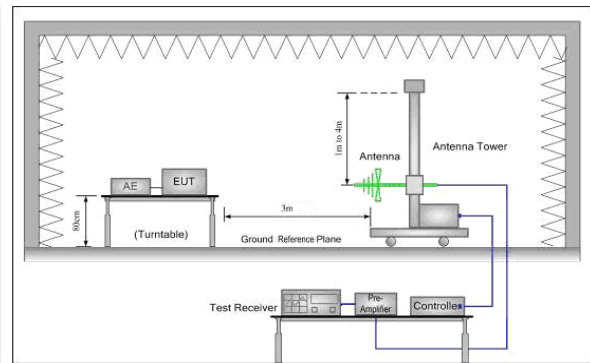


Figure 2. 30MHz to 1GHz

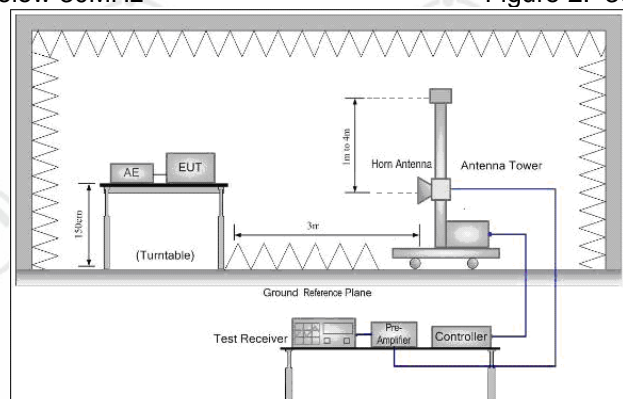


Figure 3. Above 1GHz

### Test Procedure:

#### Below 1GHz test procedure as below:

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table 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.

**Above 1GHz test procedure as below:**

Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).

Test the EUT in the lowest channel ,middle channel, the Highest channel

The radiation measurements are performed in X, Y, Z axis positioning for Remote TX, and found the X axis positioning which it is worse case.

Repeat above procedures until all frequencies measured was complete.

**Limit:**

(Spurious Emissions)

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

**Limit:**

(Field strength of the fundamental signal)

Frequency	Limit (dBμV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

**Exploratory Test Mode:**

Remote TX

**Final Test Mode:**

Pretest the EUT at Remote TX , Remote TX which it is worse case  
Only the worst case is recorded in the report.

**Instruments Used:**

Refer to section 5.11 for details

**Test Results:**

Pass



**Measurement Data**

**Field Strength Of The Fundamental Signal**

Peak value:

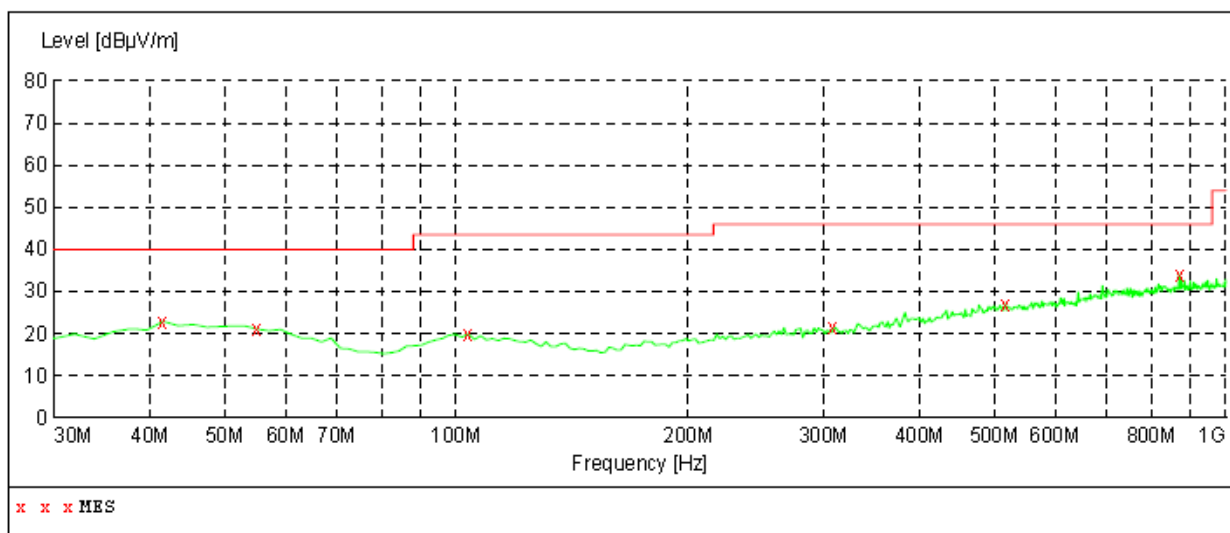
Frequency (MHz)	Height (cm)	Azimuth (deg)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result	Antenna Polaxis
2402.000	150.0	10.0	86.80	114.00	27.2	Pass	H
2402.000	150.0	313.0	86.50	114.00	27.5	Pass	V
2440.000	150.0	290.0	77.00	114.00	37.0	Pass	H
2440.000	150.0	133.0	82.40	114.00	31.6	Pass	V
2480.000	150.0	301.0	81.70	114.00	32.3	Pass	H
2480.500	150.0	269.0	79.60	114.00	34.4	Pass	V

**Remark:** Scan from Field Strength Of The Fundamental Signal data, The average value is lower than limit, and The below the limit need not be reported, so only the peak value had been displayed.



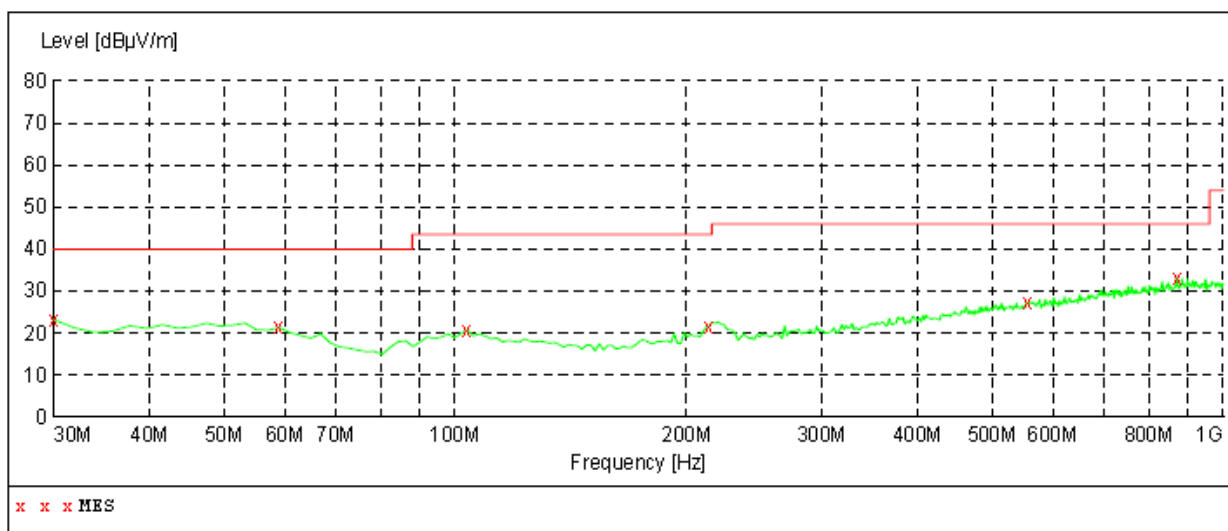
# Spurious Emissions

30MHz~1GHz



## MEASUREMENT RESULT:

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
41.640000	22.90	15.9	40.0	17.1	---	200.0	37.00	HORIZONTAL
55.220000	21.10	15.8	40.0	18.9	---	200.0	70.00	HORIZONTAL
103.720000	20.00	14.5	43.5	23.5	---	100.0	158.00	HORIZONTAL
309.360000	21.50	16.2	46.0	24.5	---	200.0	294.00	HORIZONTAL
516.940000	27.00	21.6	46.0	19.0	---	200.0	10.00	HORIZONTAL
870.020000	34.10	26.3	46.0	11.9	---	100.0	248.00	HORIZONTAL



**MEASUREMENT RESULT:**

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	23.20	13.7	40.0	16.8	---	100.0	201.00	VERTICAL
59.100000	21.30	15.3	40.0	18.7	---	100.0	153.00	VERTICAL
103.720000	20.70	14.5	43.5	22.8	---	200.0	25.00	VERTICAL
214.300000	21.70	14.1	43.5	21.8	---	200.0	270.00	VERTICAL
555.740000	27.30	21.9	46.0	18.7	---	200.0	159.00	VERTICAL
870.020000	33.30	26.3	46.0	12.7	---	200.0	360.00	VERTICAL

**Above 1GHz**

Test mode:	Transmitting		Test channel:	2402MHz		Remark:	Peak
Frequency (MHz)	Height (cm)	Azimuth (deg)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result	Antenna Polaxis
1188.000	150.0	199.0	41.80	74	32.2	Pass	H
3914.000	150.0	61.0	48.80	74	25.2	Pass	H
4807.000	150.0	245.0	53.20	74	20.8	Pass	H
1282.000	150.0	10.0	41.70	74	32.3	Pass	V
1587.500	150.0	359.0	52.70	74	21.3	Pass	V
4407.500	150.0	129.0	49.30	74	24.7	Pass	V

Test mode:	Transmitting		Test channel:	2440MHz		Remark:	Peak
Frequency (MHz)	Height (cm)	Azimuth (deg)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result	Antenna Polaxis
1023.500	150.0	179.0	41.50	74	32.5	Pass	H
1587.500	150.0	133.0	48.70	74	25.3	Pass	H
3679.000	150.0	226.0	49.40	74	24.6	Pass	H
1587.500	150.0	336.0	52.80	74	21.2	Pass	V
2057.000	150.0	221.0	44.70	74	29.3	Pass	V
3279.000	150.0	336.0	49.00	74	25.0	Pass	V

Test mode:	Transmitting		Test channel:	2480MHz		Remark:	Peak
Frequency (MHz)	Height (cm)	Azimuth (deg)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result	Antenna Polaxis
1587.500	150.0	324.0	45.20	74	28.8	Pass	H
2057.500	150.0	347.0	45.10	74	28.9	Pass	H
5864.500	150.0	70.0	50.50	74	23.50	Pass	H
1587.500	150.0	61.0	45.90	74	28.1	Pass	V
2057.500	150.0	199.0	45.90	74	28.5	Pass	V
7251.000	150.0	199.0	51.20	74	22.8	Pass	V

**Remark:**

- 1) 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 - Correct Factor  
Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor
- 2) Scan from 9kHz to 25GHz, The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

### 7.3 Restricted bands around fundamental frequency

**Test Requirement:** 47 CFR Part 15C Section 15.209 and 15.205  
**Test Method:** ANSI C63.10  
**Test Site:** Measurement Distance: 3m (Semi-Anechoic Chamber)  
**Limit(Band Edge):** Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Frequency	Limit (dB $\mu$ V/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 Setup:

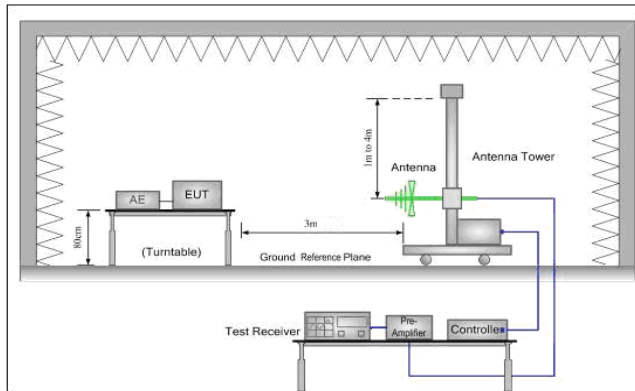


Figure 1. 30MHz to 1GHz

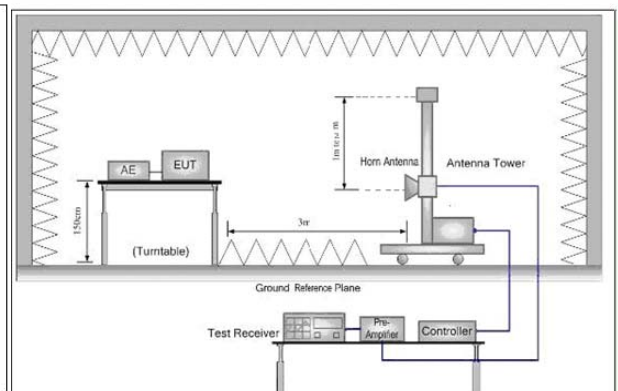


Figure 2. Above 1 GHz

#### Test Procedure:

##### Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable 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.

##### Above 1GHz test procedure as below:

- Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
- Test the EUT in the lowest channel , the Highest channel

- Instruments Used:**  
**Exploratory Test Mode:**  
**Final Test Mode:**  
**Test Results:**
- i. The radiation measurements are performed in X, Y, Z axis positioning for Remote TX, and found the X axis positioning which it is worse case.
  - j. Repeat above procedures until all frequencies measured was complete.
- Refer to section 5.10 for details  
Remote TX  
Pretest the EUT at Remote TX  
Only the worst case is recorded in the report.  
Pass

**Test plot as follows:**

Frequency (MHz)	Height (cm)	Azimuth (deg)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result	Antenna Polaxis
2390.000	150.0	13.0	53.30	74	20.7	Pass	H
2390.000	150.0	290.0	53.10	74	20.9	Pass	V
2400.000	150.0	329.0	53.62	74	20.38	Pass	H
2400.000	150.0	125.0	52.68	74	21.32	Pass	V
2483.500	150.0	88.0	48.70	74	25.3	Pass	H
2483.500	150.0	61.0	49.10	74	24.9	Pass	V

**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 - Correct Factor

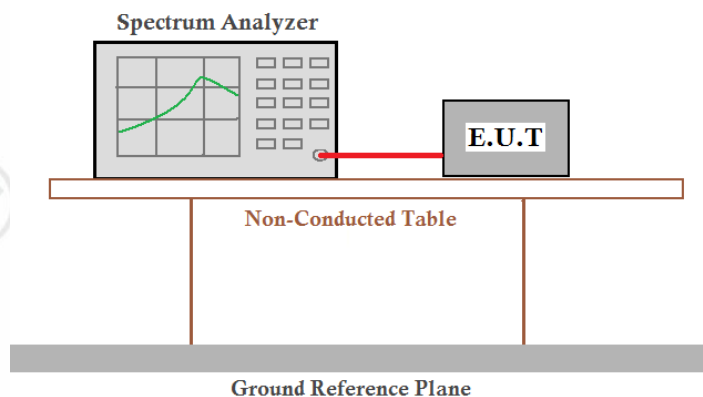
Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor

**Remark:** Scan from the test data, The average value is lower than limit, and The below the limit need not be reported, so only the peak value had been displayed.



## 7.4 20dB Bandwidth

**Test Requirement:** 47 CFR Part 15C Section 15.215  
**Test Method:** ANSI C63.10  
**Test Setup:**



**Test Mode:** Transmitter mode  
**Limit:** N/A  
**Instruments Used:** Refer to section 5.11 for details  
**Test Results:** Pass

### Measurement Data

Test Channel	20dB bandwidth (MHz)	Results
Lowest	1.008	Pass
Middle	1.002	Pass
Highest	1.014	Pass

### Test plot as follows:

Test channel: 2402MHz

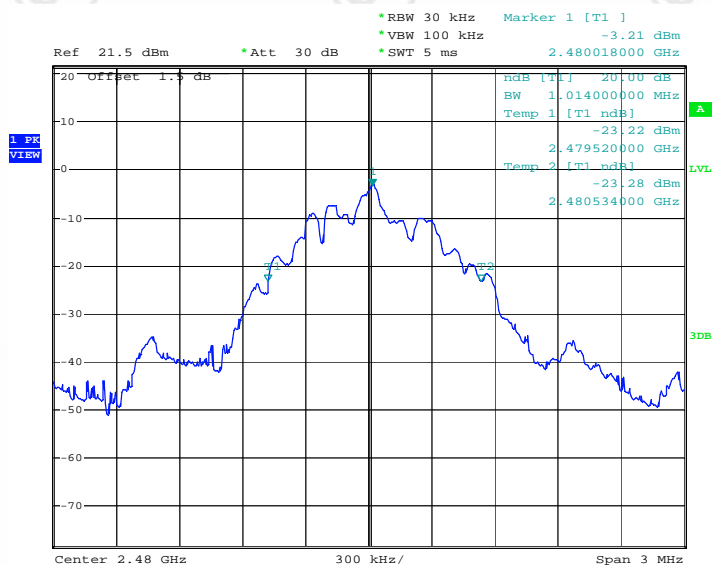


Report No. : EED32H001228-2  
Test channel: 2440MHz

Page 20 of 28



Test channel: 2480MHz



## APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.: SSA-00189



**Radiated emission Test Setup-1(Below 1GHz)**



**Radiated spurious emission Test Setup-2(Above 1GHz)**

## APPENDIX 2 PHOTOGRAPHS OF EUT



View of Product-1



View of Product-2





View of Product-3



View of Product-4





View of Product-5



View of Product-6



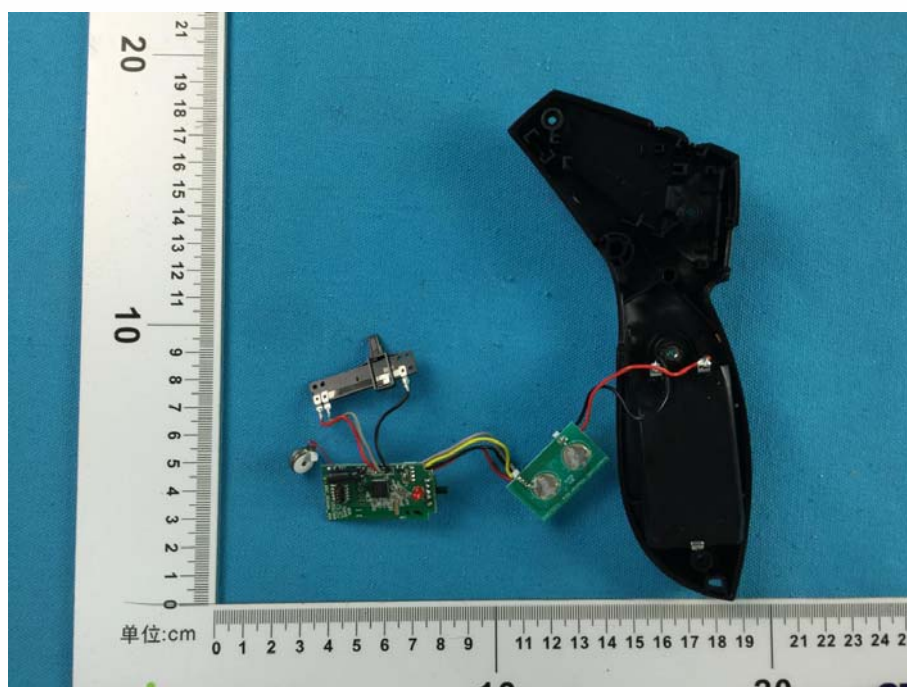
View of Product-7



View of Product-8

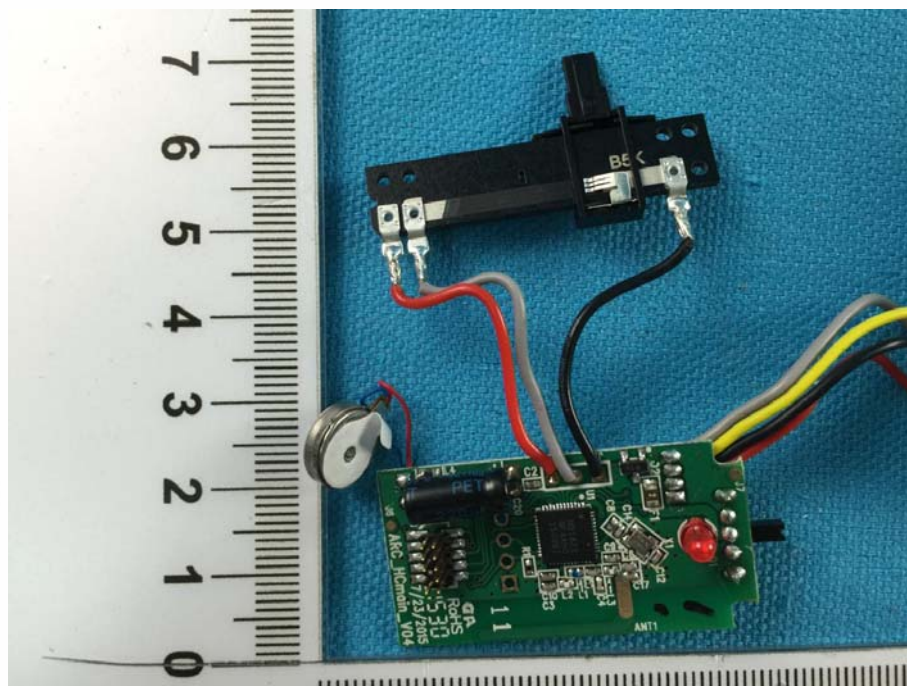


View of Product-9

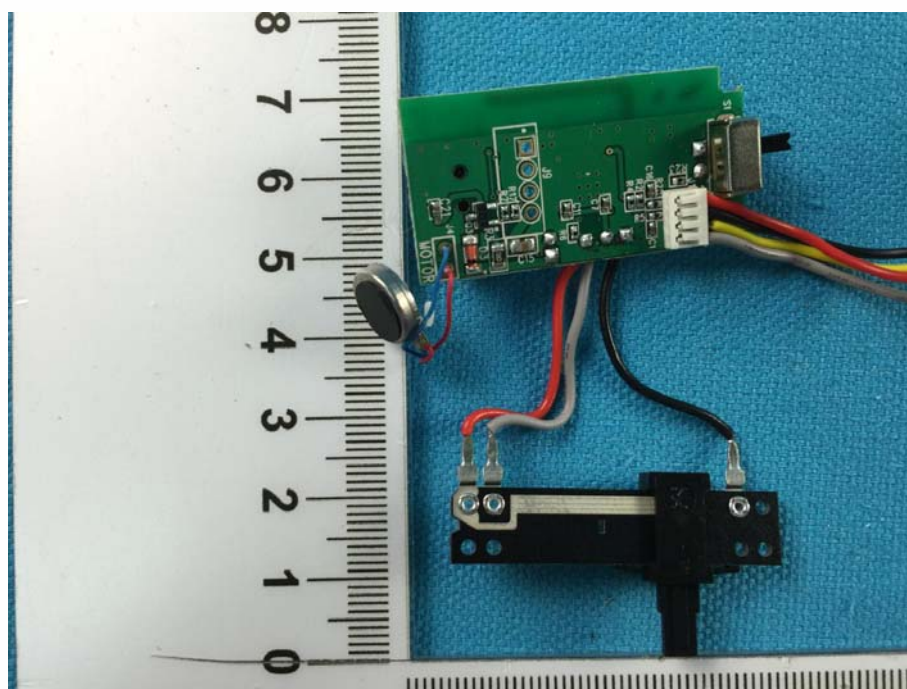


View of Product-10

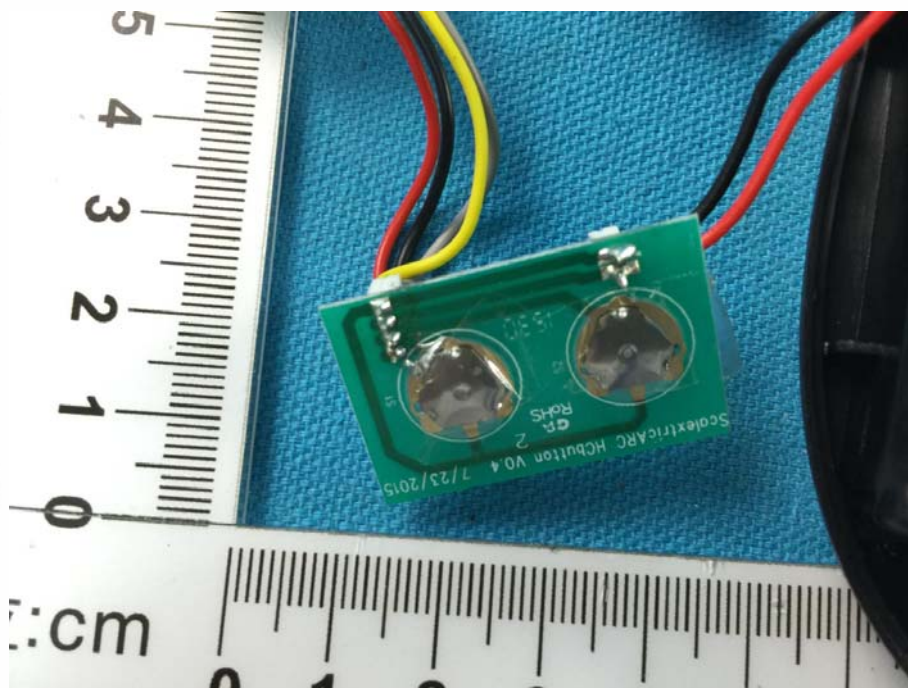




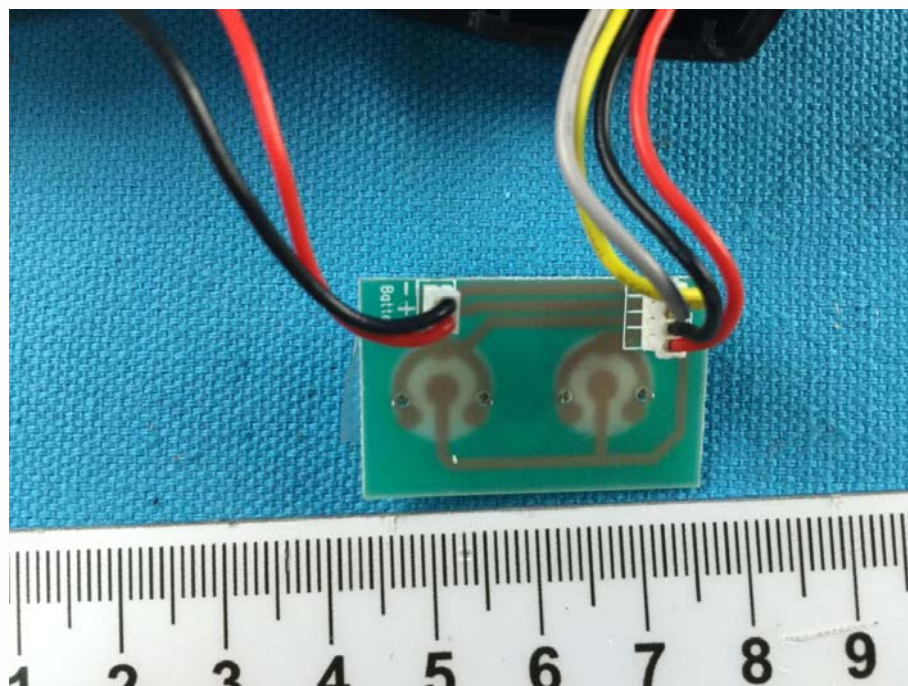
View of Product-11



View of Product-12



View of Product-13



View of Product-14

\*\*\* End of Report \*\*\*

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.