



# **FCC 47 CFR PART 15 SUBPART C**

## **TEST REPORT**

*For*

**Applicant : YUYAO CHANS MOTOR CO., LTD.**

**Address : NO.1358,Tanjialing West Road,Yuyao,Zhejiang,China**

**Product Name : Wireless Controller**

**Model Name : CHT-2**

**Brand Name : N/A**

**FCC ID : YHN-CHT2**

**Report No. : MOST100508F1**

**Date of Issue : June 24, 2010**

**Issued by : Most Technology Service Co., Ltd.**

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**1. VERIFICATION OF CONFORMITY**

**Equipment Under Test:** Wireless Controller  
**Brand Name:** N/A  
**Model Number:** CHT-2  
**FCC ID:** YHN-CHT2  
**Applicant:** YUYAO CHANS MOTOR CO., LTD.  
NO.1358,Tanjialing West Road, Yuyao, Zhejiang, China  
**Manufacturer:** YUYAO CHANS MOTOR CO., LTD.  
NO.1358,Tanjialing West Road, Yuyao, Zhejiang, China  
**Technical Standards:** 47 CFR Part 15 Subpart C  
**File Number:** MOST100508F1  
**Date of test:** May 25, 2010– June 24, 2010  
**Deviation:** None  
**Condition of Test Sample:** Normal  
**Test Result:** PASS

The above equipment was tested by Most Technology Service Co., Ltd. for compliance with the requirements set forth in FCC rules and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature):



Candy Zhang

June 24, 2010

Review by (+ signature):



Sam Zhong

June 24, 2010

Approved by (+ signature):



Yvette Zhou

June 24, 2010



## 2. GENERAL INFORMATION

### 2.1 Product Information

Product	Wireless Controller
Brand Name	N/A
Model Number	CHT-2
Series Model Name:	N/A
Series Model Difference description:	N/A
Power Supply	DC 6V by battery
Frequency Range	433.92 MHz
Modulation Technique	ASK
Antenna Gain	1.0 dBi
Temperature Range	-10°C-50°C

**NOTE:**

1. Please refer to Appendix I for the photographs of the EUT. For a more detailed features description about the EUT, please refer to User's Manual.

## 2.2 Objective

The objective of the report is to perform tests according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-05 Edition)	Radio Frequency Devices

## 2.3 Test Standards and Results

Test items and the results are as bellow:

No.	Section	Description	Result	Date of Test
1	15.231	Transmission Time	PASS	2010-05-27
2	15.231	Duty Cycle	PASS	2010-05-27
3	15.231	Radiated Emission	PASS	2010-06-03
4	15.231	20dB Bandwidth	PASS	2010-05-27
5	15.231	Conducted Emission	Not Applicable	2010-06-03
6	15.231	Antenna Requirement	PASS	2010-06-03

Note: 1. The test result judgment is decided by the limit of measurement standard  
2. The information of measurement uncertainty is available upon the customer's request.

## 2.4 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

### 3. TEST METHODOLOGY

#### 3.1 TEST FACILITY

Test Site:	Most Technology Service Co.,Ltd
Location:	No.5, Langshan 2nd Rd., North Hi-Tech Industrial park , Nanshan Shenzhen, Guangdong ,China
Description:	<p>There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2003 and CISPR 16 requirements.</p> <p>The FCC Registration Number is <b>490827</b>.</p>
Site Filing:	The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
Instrument Tolerance:	All measuring equipment is in accord with ANSI C63.4:2003 and CISPR 16 requirements that meet industry regulatory agency and accreditation agency requirement.
Ground Plane:	Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna.

#### 3.2 GENERAL TEST PROCEDURES

##### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4:2003,Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4:2003.

## 4 SETUP OF EQUIPMENT UNDER TEST

### 4.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### 4.2 SUPPORT EQUIPMENT

Device Type	Brand	Model	FCC ID	Series No.	Audio Cable	Power Cord
N/A						

*Remark:*

*All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



### 4. 3 TEST EQUIPMENT LIST

**Instrumentation:** The following list contains equipment used at Most for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

No.	Equipment	Manufacturer	Model No.	S/N	Calibration due date
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2011/03/14
2	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2011/03/14
3	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2011/03/14
4	Terminator	Hubersuhner	50Ω	No.1	2011/03/14
5	RF Cable	SchwarzBeck	N/A	No.1	2011/03/14
6	Test Receiver	Rohde & Schwarz	ESPI	101202	2011/03/14
7	Bilog Antenna	Sunol	JB3	A121206	2011/03/14
8	Test Antenna - Horn	Schwarzbeck	BBHA 9120C	--	2011/03/14
9	Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	--	2011/03/14
10	Cable	Resenberger	N/A	NO.1	2011/03/14
11	Cable	SchwarzBeck	N/A	NO.2	2011/03/14
12	Cable	SchwarzBeck	N/A	NO.3	2011/03/14
13	DC Power Filter	DuoJi	DL2×30B	N/A	2011/03/14
14	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2011/03/14
15	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2011/03/14
16	Test Receiver	Rohde & Schwarz	ESCI	100492	2011/03/14
17	Absorbing Clamp	Luthi	MDS21	3635	2011/03/14
18	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2011/03/14
19	AC Power Source	Kikusui	AC40MA	LM003232	2011/03/14
20	Test Analyzer	Kikusui	KHA1000	LM003720	2011/03/14
21	Line Impedence Network	Kikusui	LIN40MA-PCR-L	LM002352	2011/03/14
22	ESD Tester	Kikusui	KES4021	LM003537	2011/03/14
23	EMC PRO System	EM Test	UCS-500-M4	V0648102026	2011/03/14
24	Signal Generator	IFR	2032	203002/100	2011/03/14
25	Amplifier	A&R	150W1000	301584	2011/03/14
26	CDN	FCC	FCC-801-M2-25	47	2011/03/14
27	CDN	FCC	FCC-801-M3-25	107	2011/03/14
28	EM Injection Clamp	FCC	F-203I-23mm	403	2011/03/14
29	RF Cable	MIYAZAKI	N/A	No.1/No.2	2011/03/14
30	Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	0304789	2011/03/14
31	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2011/03/14
32	Test Antenna - Loop	Schwarzbeck	BBHA 9120D	--	2011/03/14

**NOTE:** Equipments listed above have been calibrated and are in the period of validation.

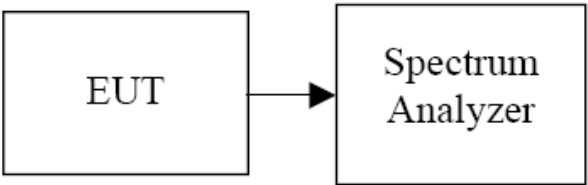
5. 47 CFR Part 15 C Requirements

5.1 Transmission Time

5.1.1 Limit

According to 15.231 (a) (1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

5.1.2 Test Configuration

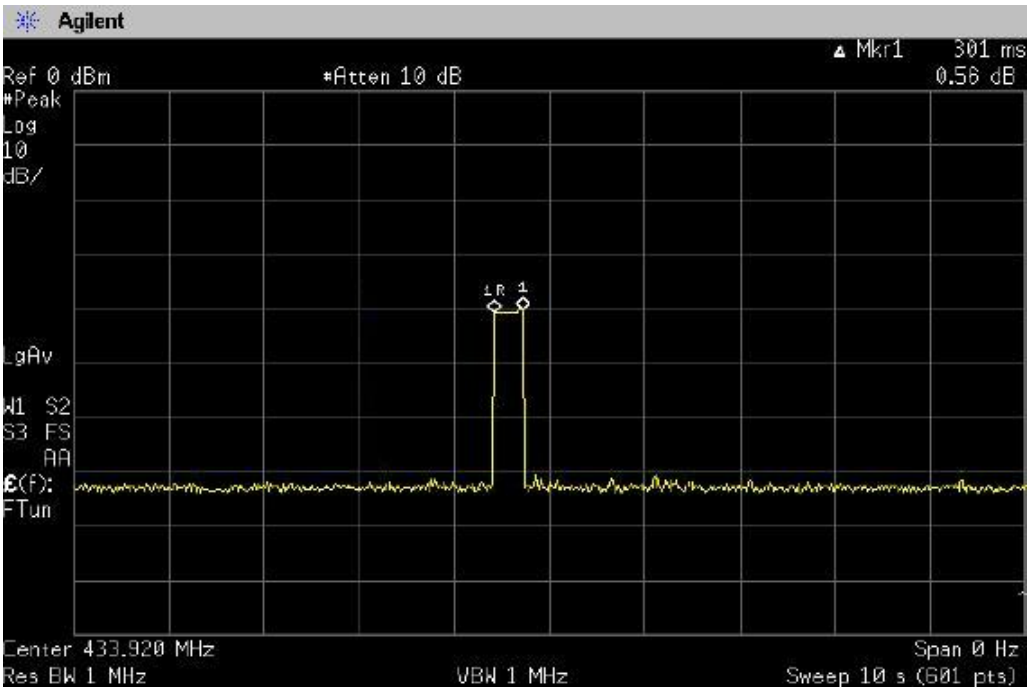


5.1.3 Test Description

- 1. The transmitter output is connected to the spectrum analyzer.
- 2. The spectrum analyzer center frequency is set to the transmitter frequency.
- 3. The RBW and VBW are set to 1MHz.

5.1.4 Test Result

Frequency (Hz)	Transmission Time (ms)	Limit (s)	Test Result
433.92	301	5.00	PASS

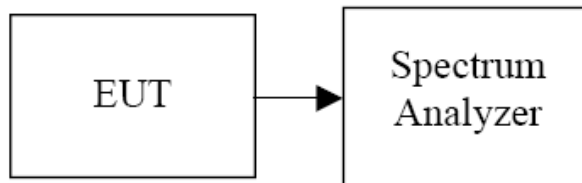


## 5.2 Duty Cycle

### 5.2.1 Limit

Nil (No dedicated limit specified in the Rules)

### 5.2.2 Test Configuration



### 5.2.3 Test Description

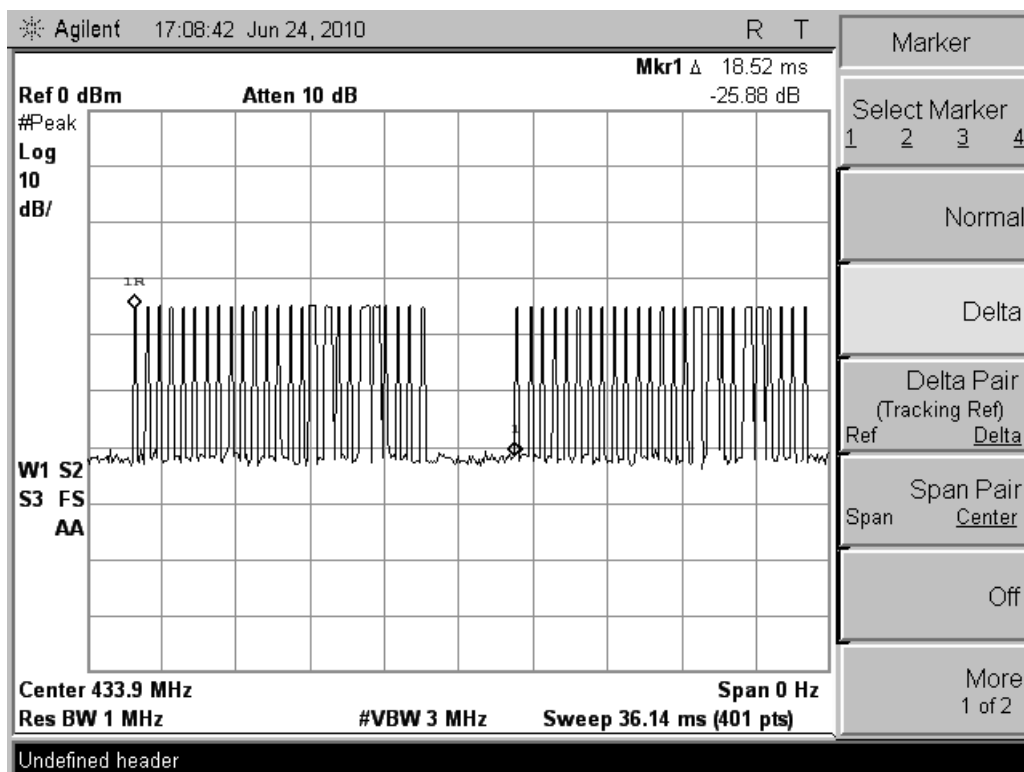
1. The transmitter output is connected to the spectrum analyzer.
2. The spectrum analyzer center frequency is set to the transmitter frequency.
3. The RBW and VBW are set to 1MHz.

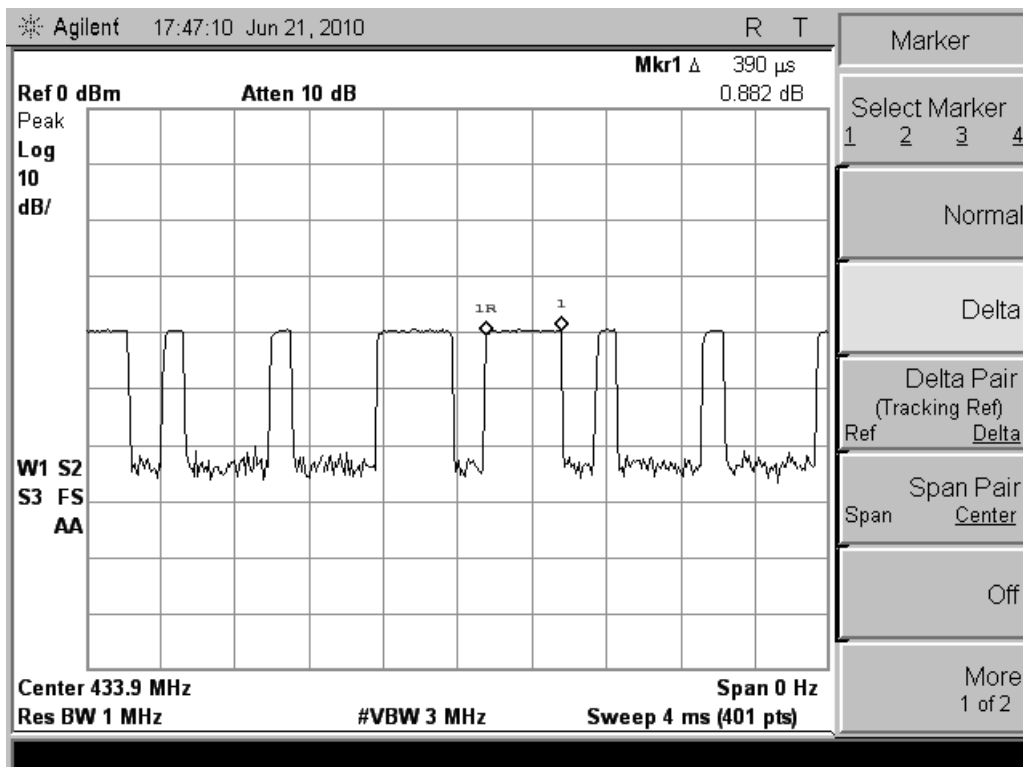
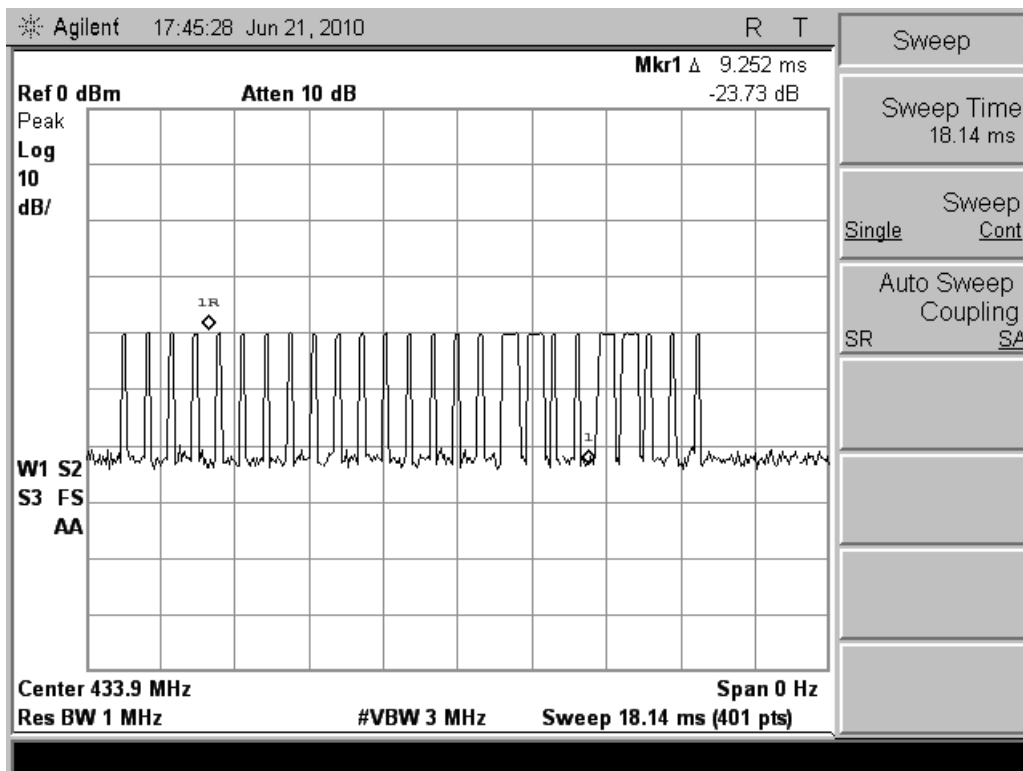
### 5.2.4 Test Result

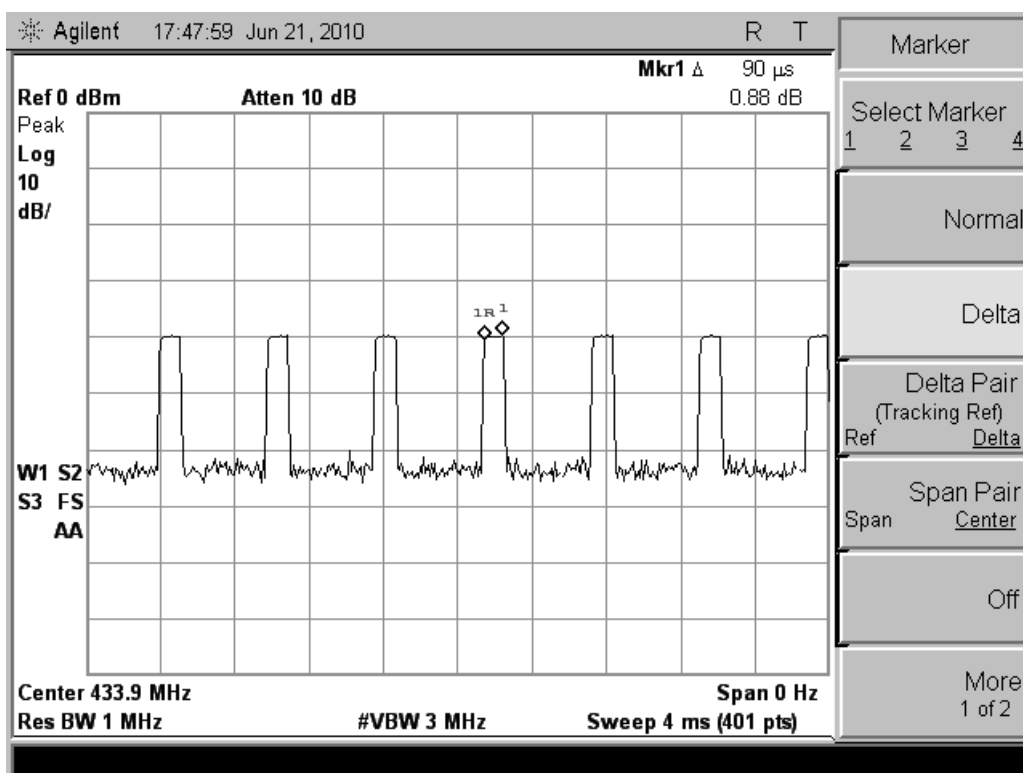
TX on=  $(0.39 \times 4) + (0.090 \times 21) = 3.450 \text{ ms}$

Duty Cycle Factor=  $20 \times \log(3.45/18.52) = -14.55$

### Test Plot:







## 5.3 Radiated Emission

### 5.3.1 Definition

In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (μV/m)	Field Strength of Spurious Emission (μV/m)
40.66 - 40.70	2250	225
70 - 130	1250	125
130 - 174	1250 to 3750	125 to 375
174 – 260	3750	375
260-470	3750 to 12500	375 to 1250
Above 470	12500	1250

**Remark:** Where  $F$  is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz,  $\mu\text{V/m}$  at 3 meters =  $56.81818(F) - 6136.3636$ ; for the band 260-470 MHz,  $\mu\text{V/m}$  at 3 meters =  $41.6667(F) - 7083.3333$ . The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

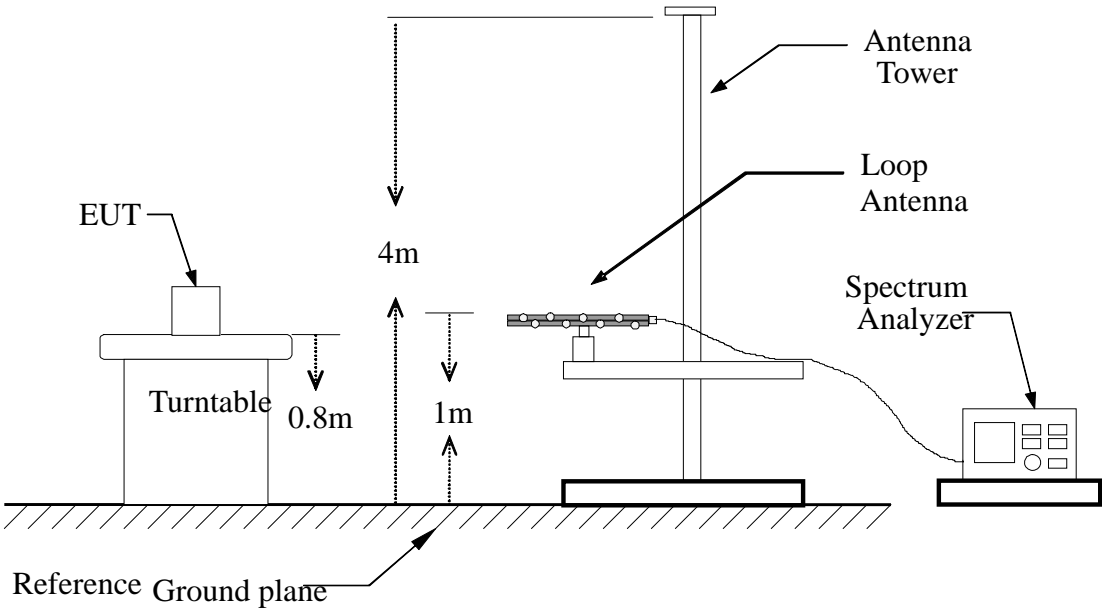
2. In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength of Fundamental (dBμV/m at 3-meter)	Field Strength of Spurious Emission (dBμV/m at 3-meter)	Test Distance (m)
40.66 - 40.70	67.04	47.04	3
70 - 130	61.94	41.94	3
130 - 174	61.94 to 71.48	41.94 to 51.48	3
174 – 260	71.48	51.48	3
260-470	71.48 to 81.94	51.48 to 61.94	3
Above 470	81.94	61.94	3

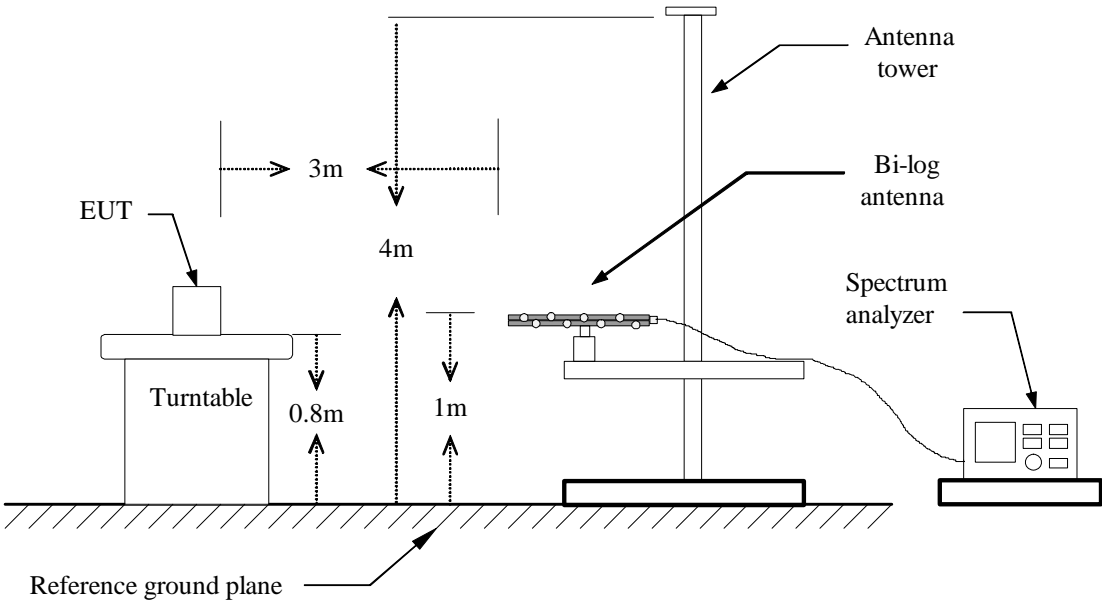
5.3.2 Test Configuration

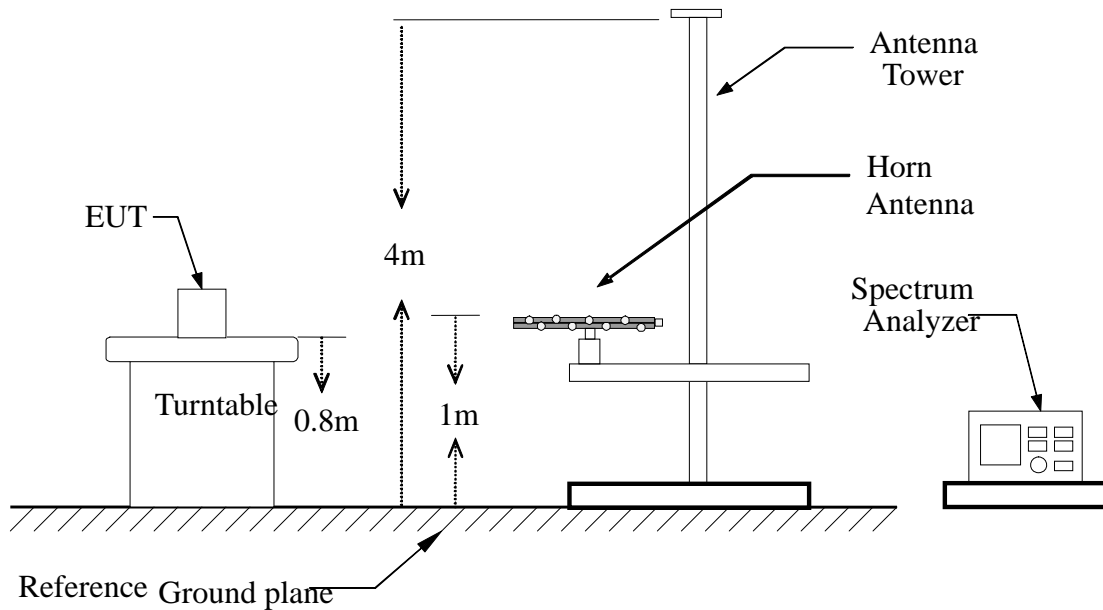
Test Setup:

Below 30 MHz:



Form 30MHz to 1000MHz:



**Above 1000MHz:****5.3.3 Test Description**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
  - Below 1GHz: RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
  - Above 1GHz : (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.



### 5.3.4 Test Result

**Operation Mode:** TX (worst mode-Y mode)

**Test Date:** 2010-06-03

**Temperature:** 20°C

**Tested by:** Petter Ping

**Humidity:** 70 % RH

**Polarity:** Ver. / Hor.

Freq.	Ant.	Peak	Factor	Actual FS	Actual FS	Peak	Average	Peak	Average
(MHz)	Pol.	Reading	(dB)	Peak	Average	Limit	Limit	Margin	Margin
	H/V	(dBuV)		(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	(dB)
< 30	V	--	--	--	---	--	--	>20	>20
433.92	V	56.97	20.34	77.31	62.76	100.83	80.83	-23.52	-18.07
867.04	V	23.63	27.02	50.65	36.10	80.83	60.83	-30.18	-24.73
1301.76	V	18.11	30.15	48.26	33.71	74.00	54.00	-25.74	-20.29
1735.68	V	--	--	--	---	80.83	60.83	>20	>20
--									
< 30	H	--	--	--	---	--		>20	>20
433.92	H	35.88	20.34	56.22	41.67	100.83	80.83	-44.61	-39.16
867.04	H	20.47	27.02	47.49	32.94	80.83	60.83	-33.34	-27.89
1301.76	H	15.99	30.15	46.14	31.59	74.00	54.00	-27.86	-22.41
1735.68	H	--	--	--	---	80.83	60.83	>20	>20
--									

**Notes:**

1. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.

2. Duty Cycle Factor=-14.55 dB

AV value =Peak value+ Duty Cycle Factor

## 5.4 20dB Bandwidth

### 5.4.1 Definition

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### 5.4.2 Test Description

The EUT was placed on a non-conductive table 0.8 meters above the floor. The table was rotated to an angle which presented the highest signal level. The occupied bandwidth was based on a 20 dB criteria (20 dB down either side of the emission from the peak emission). A drawing showing the test setup is given as Figure 1.

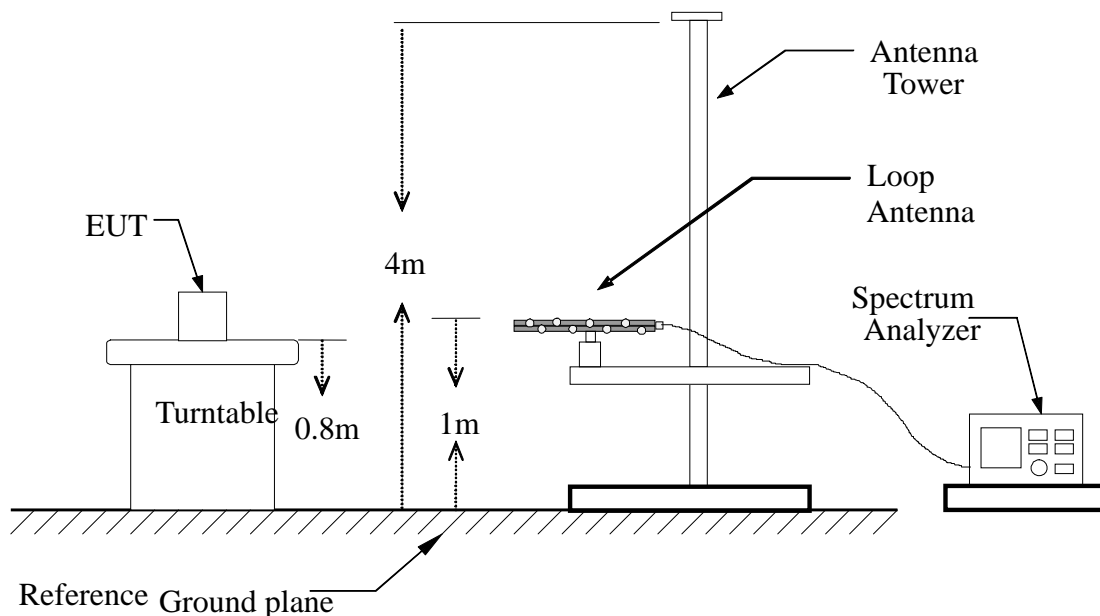
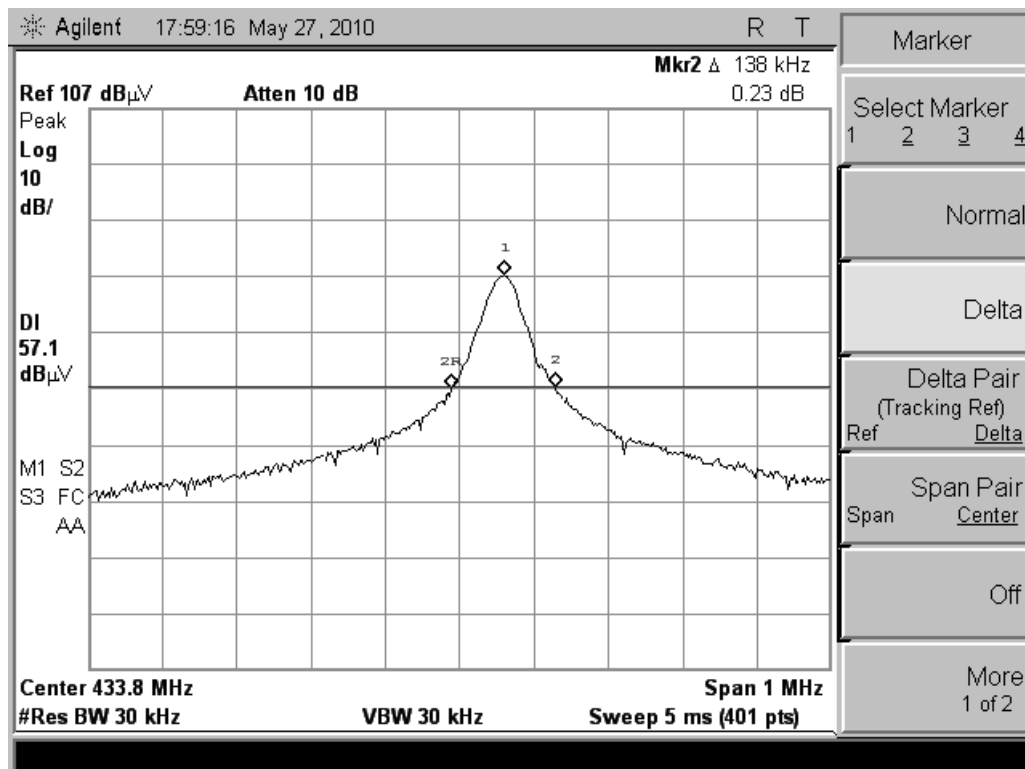


Figure 1: Radiated Emission Test Setup

### 5.4.3 Test Result

Frequency (MHz)	20 dB Bandwidth (MHz)	Limit (MHz)	Result
433.92	0.138	1.0848	PASS

## Test Plot:



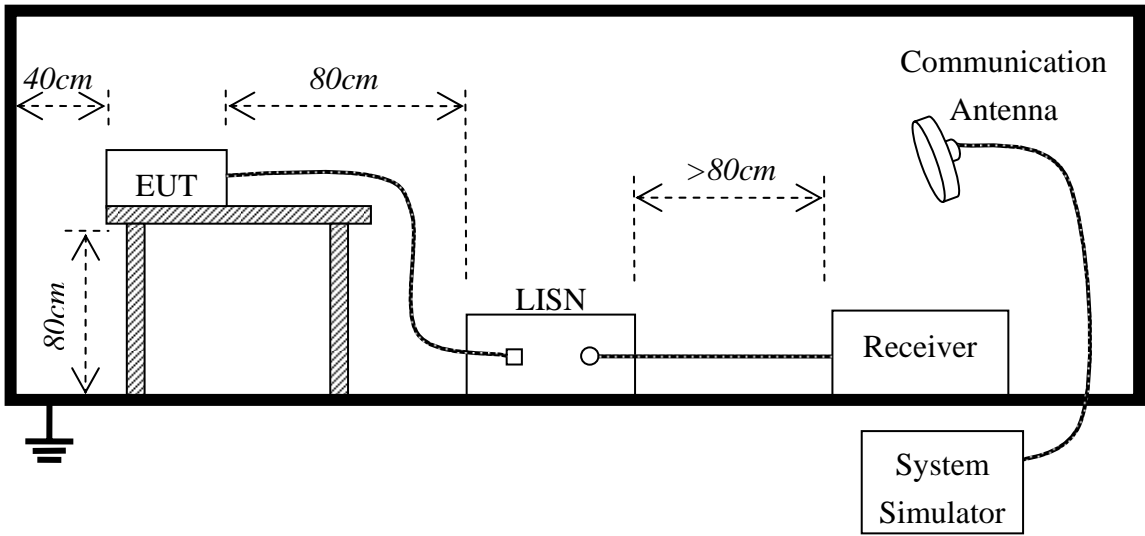
5.5 Conducted Emission (Not Applicable)

5.5. 1 Definition

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

**\*\*Note:** 1. the lower limit shall apply at the transition frequency.  
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

5.5. 2 Block Diagram of Test Setup



### 5.5. 3 Preliminary Procedure of Line Conducted Emission Test

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per FCC Part 15 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per FCC Part 15.
- 3) All I/O cables were positioned to simulate typical actual usage as per FCC Part 15.
- 4) The EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5) All support equipments received power from a second LISN supplying power of AC 120V/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

Preliminary Conducted Emission Test				
Frequency Range Investigated		150KHz TO 30 MHz		
Mode of operation	Date	Report No.	Data#	Worst Mode
--				

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### 5.5.4 Final Procedure of Line Conducted Emission Test

EUT and support equipment was set up on the test bench as per step 9 of the preliminary test.

A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

The test data of the worst case condition(s) was reported on the Summary Data page.

### **5.5.5 Test Result of Line Conducted Emission Test**

Not applicable (Since the EUT is powered by battery).

## **5.6 Antenna Requirement**

### **5.6.1 Definition**

An analysis of the CHT-2 was performed to determine compliance with FCC Section 15.203. This section requires specific handling and control of antennas used for devices subject to regulations.

### **5.6.2 Evaluation Procedure**

The structure and application of the CHT-2 was analyzed with respect to the rules. The antenna is an internal antenna, and is not accessible to the user. An auxiliary antenna port is not present.

### **5.6.3 Evaluation Criteria**

Section 15.203 of the rules states that the subject device must meet at least one of the following criteria:

- (a) Antenna must be permanently attached to the unit.
- (b) Antenna must use a unique type of connector to attach to the EUT.
- (c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

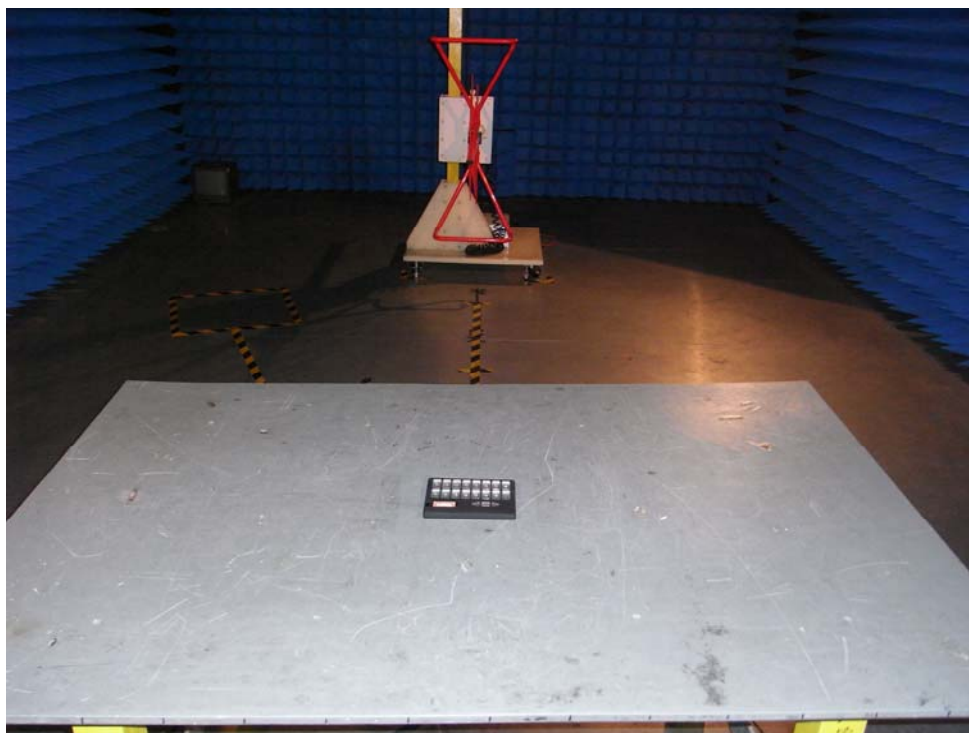
### **5.6.4 Evaluation Results**

The CHT-2 meets the criteria of this rule by virtue of having an internal antenna inaccessible to the user. The EUT is therefore compliant.

**APPENDIX 1**  
**PHOTOGRAPHS OF TEST SETUP**



### Radiated Emission Test Setup



**APPENDIX 2**  
**PHOTOGRAPHS OF EUT**

FRONT VIEW OF SAMPLE



BACK VIEW OF SAMPLE



LEFT VIEW OF SAMPLE



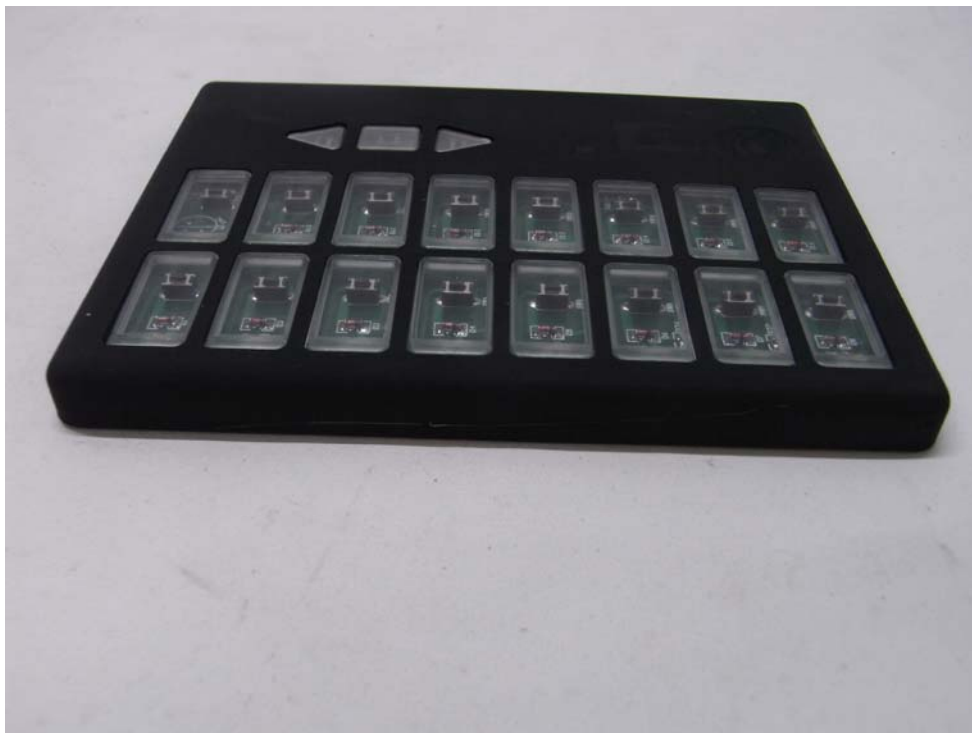
RIGHT VIEW OF SAMPLE



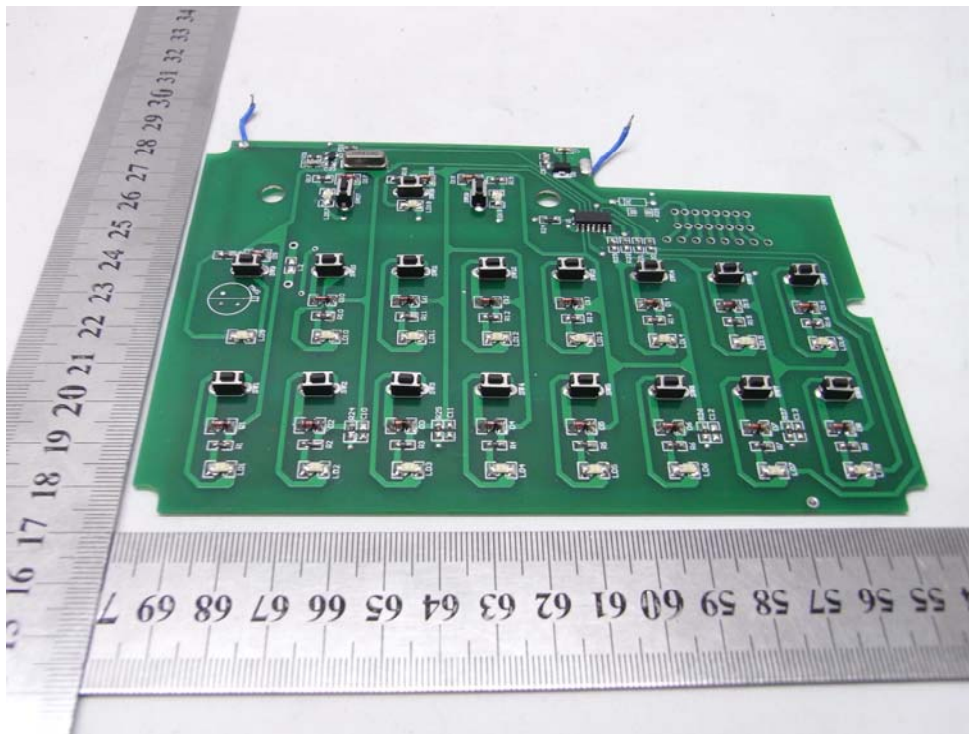
TOP VIEW OF SAMPLE



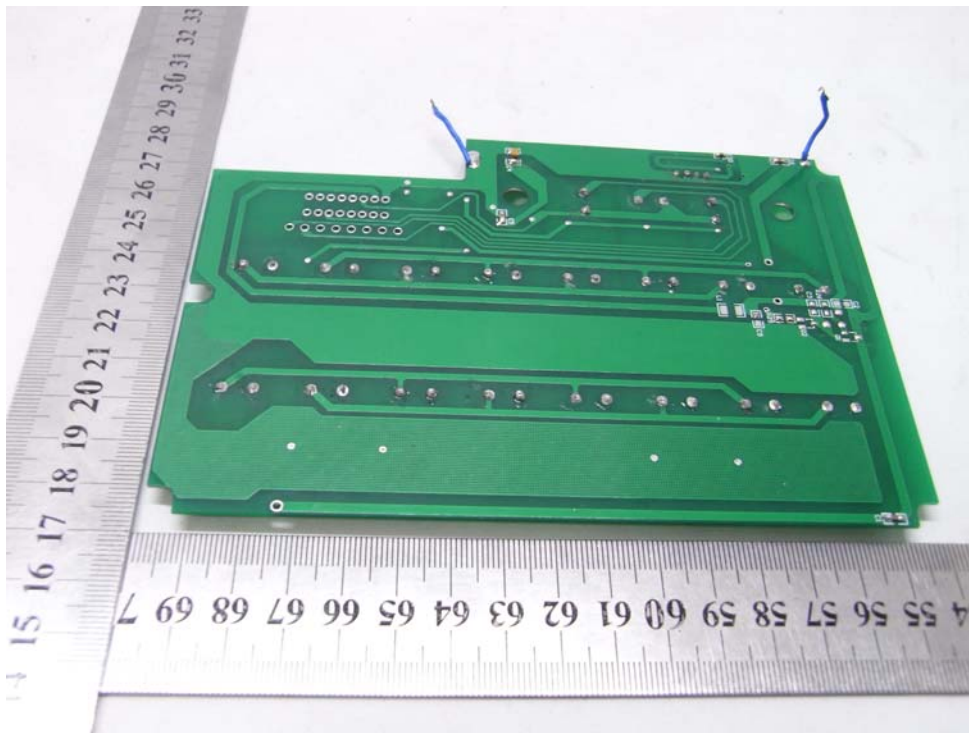
BOTTOM VIEW OF SAMPLE



INTERNAL PHOTO OF SAMPLE - 1



INTERNAL PHOTO OF SAMPLE - 2



-----END OF REPORT-----