FCC TEST REPORT

FCC ID : YVV-A03

Applicant : Shenzhen AEE Technology CO., LTD.
Adress of Applicant : AEE Hi-Tech Park,Sun Industrial Area,Xili, Nanshan District,Shenzhen,P.R.C

Equipment Under Test (EUT) :

Product description : Remote Controller

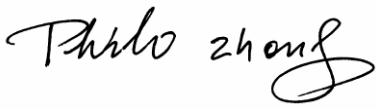
Model No. : A03C/A03L/A03P

Standards : FCC 15 Subpart C Paragraph 15.231

Date of Test : Oct.18,2010

Test Engineer : 

(Olic.Huang)

Reviewed By : 

(Philo zhong)

PERPARED BY:
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2 Contents

3 Test Summary

Test items	Test Requirement	Test Method	Class / Severity	Result
Periodic operation	FCC PART 15: 2008	ANSI C63.4: 2003	**Note**	PASS
Band Edge	FCC PART 15: 2008	ANSI C63.4: 2003	**Note**	PASS
Radiated Emission (30MHz to 5GHz)	FCC PART 15: 2008	ANSI C63.4: 2003	N/A	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2008	ANSI C63.4: 2003	N/A	N/A

Note : denote that for more details of the EUT , please refer to the relating test items as below .

Remark : the methods of measurement in all the test items were according to ANSI C63.4: 2003.

4 General Information

4.1 Client Information

Applicant:	Shenzhen AEE Technology CO., LTD.
Address:	AEE Hi-Tech Park,Sun Industrial Area,Xili，Nanshan District,Shenzhen,P.R.C
Manufacturer:	Shenzhen AEE Technology CO., LTD.
Address:	AEE Hi-Tech Park,Sun Industrial Area,Xili，Nanshan District,Shenzhen,P.R.C

4.2 General Description of E.U.T.

Product description:	Remote Controller
Model No.:	A03C/A03L/A03P

4.3 Details of E.U.T.

Power Supply:	Battery 3.0V
Modulation :	ASK

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Remote Controller . The standards used were FCC 15 Paragraph 15.231, Paragraph 15.205, Paragraph 15.31,Paragraph 15.33, Paragraph 15.35.

4.6 Test Facility

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

- **IC – Registration No.:7760A**

  Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration IC7760A,Aug. 03,2010.

- **FCC – Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, June 24, 2008. compliance

4.7 Test Location

All Emissions testswere performed at:-

Waltek Services(Shenzhen) Co., Ltd. at 1/F, Fukangtai Building,West Baima Rd., Songgang Street, Baoan District, Shenzhen518105, China.

5 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY45114943	W2008001	9k-26.5GHz	Aug-03-10	Aug-02-11	Wws20081596	±1dB
Trilog Broadband Antenne 30-3000 MHz	SCHWARZBECK MESS-ELEKTROM / VULB9163	336	W2008002	30-3000 MHz	Aug-03-10	Aug-02-11		±1dB
Broad-band Horn Antenna	SCHWARZBECK MESS-ELEKTROM / VULB9163	667	W2008003	1-18GHz	Aug-03-10	Aug-02-11		f＜10 GHz：±1dB 10GHz＜f＜18 GHz：±1.5dB
Broadband Preamplifier	SCHWARZBECK MESS-ELEKTROM / BBV 9718	9718-148	W2008004	0.5-18GHz	Aug-03-10	Aug-02-11		±1.2dB
10m Coaxial Cable with N-male Connectors usable up to 25GHz,	SCHWARZBECK MESS-ELEKTROM / AK 9515 H	-	-	-	Aug-03-10	Aug-02-11		-
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connector	SCHWARZBECK MESS-ELEKTROM / AK 9513				Aug-03-10	Aug-02-11		
Positioning Controller	C&C LAB/ CC-C-IF				N/A	N/A		
Color Monitor	SUNSPO/ SP-14C				N/A	N/A		
Test Receiver	ROHDE&SCHWARZ/ ESPI	101155	W2005001	9k-3GHz	Aug-03-10	Aug-02-11	Wws20080942	±1dB
EMI Receiver	Beijingkehuan	KH3931		9k-1GHz	Aug-03-10	Aug-02-11		
Two-Line V-Network	ROHDE&SCHWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug-03-10	Aug-02-11	Wws20080941	±10%

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
Absorbing Clamp	ROHDE&SCHWARZ/ MDS-21	100205	W2005003	impandance50 Ω loss ： 17 dB	Aug-03-10	Aug-02-11	Wws20080943	±1dB
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZBECK MESS-ELEKTROM / AK 9514				Aug-03-10	Aug-02-11		
Digital Power Analyzer	Em Test AG/Switzerland/ DPA 500	V0745103095	W2008012	Power：2000VA Vol-range：0-300V Freq_range：10-80Hz	Aug-03-10	Aug-02-11	Wwd20081185	Voltage distinguish:0.025% Power_freq distinguish:0.02Hz
Power Source	Em Test AG/Switzerland/ ACS 500	V0745103096	W2008013	Vol-range：0-300V Power_freq：10-80Hz				
Electrostatic Discharge Simulator	Em Test AG/Switzerland/DITO	V0745103094	W2008005	Contact discharge：500V-10KV Air diacharge：500V-16.5KV	Aug-03-10	Aug-02-11	Wwc20082400	7.5A current will be changed in V_m=1.5V
RF Generator	TESEQ GmbH/ NSG4070	25781	W2008008	Fraq-range：9K-1GHz RF voltage：-60 dBm-+10dBm	Aug-03-10	Aug-02-11	Wws20081890	Power_freq distinguish0.1Hz RFeletricity distinguish 0.1 B
CDN M-Type	TESEQ GmbH/ CDN M016	25112	W2008009	Voltage correct factor 9.5 dB	Aug-03-10	Aug-02-11	Wwc20082396	150K-80MHz：±1dB 80-230MHz:-2-+3dB
EM-Clamp	TESEQ GmbH/ KEMZ 801	25453	W2008010	Freq_range：0.15-1000 MHz	Aug-03-10	Aug-02-11	Wwc20082397	0.3-400 MHz：±4dB Other freq：±5dB
Attenuator 6dB	TESEQ GmbH/ ATN6050	25365			Aug-03-10	Aug-02-11	Wws20081597	

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
All Modules Generator	SCHAFFNER/6150	34579	W2008006	voltage:200V-4.4KV Pulse current: 100A-2.2KA	Aug-03-10	Aug-02-11	Wwc200 82401	voltage: ±10% Pulse current: ±10%
Capacitive Coupling Clamp	SCHAFFNER/ CDN 8014	25311			Aug-03-10	Aug-02-11	Wwc200 82398	-
Signal and Data Line Coupling Network	SCHAFFNER/ CDN 117	25627	W2008011	1.2/50μS	Aug-03-10	Aug-02-11	Wwc200 82399	-
AC Power Supply	TONGYUN/ DTDGC-4				Aug-03-10	Aug-02-11	Wws200 80944	-
Exposure Level Tester ELT-400	Narda Safety TEST Solutions/2304/03	M-0155	w2008022	Test freq range：1—400kHz	Aug-03-10	Aug-02-11	Wwd200 81191	Test uncertainly : 1—120kHz:±1.83%, 120 kHz-400 kHz: ±4.06%
Magnetic Field Probe 100cm^2	Narda Safety TEST Solutions/2300/90.10	M-1070	w2008021	Test freq range：1—400kHz				Test uncertainly : 1Hz-10Hz: ±16.2%, 10Hz - 120kHz:±2.2%, 120 kHz-400 kHz: ±4.7%
Active Loop Antenna Charger 10kHz-30MHz	Beijing Dazhi / ZN30900A	-	-	10kHz-30MHz	Aug-03-10	Aug-02-11		±1dB

6 Conducted Emission Test

Product Name:	Remote Controller
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	------
Frequency Range:	150kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 Test Equipment

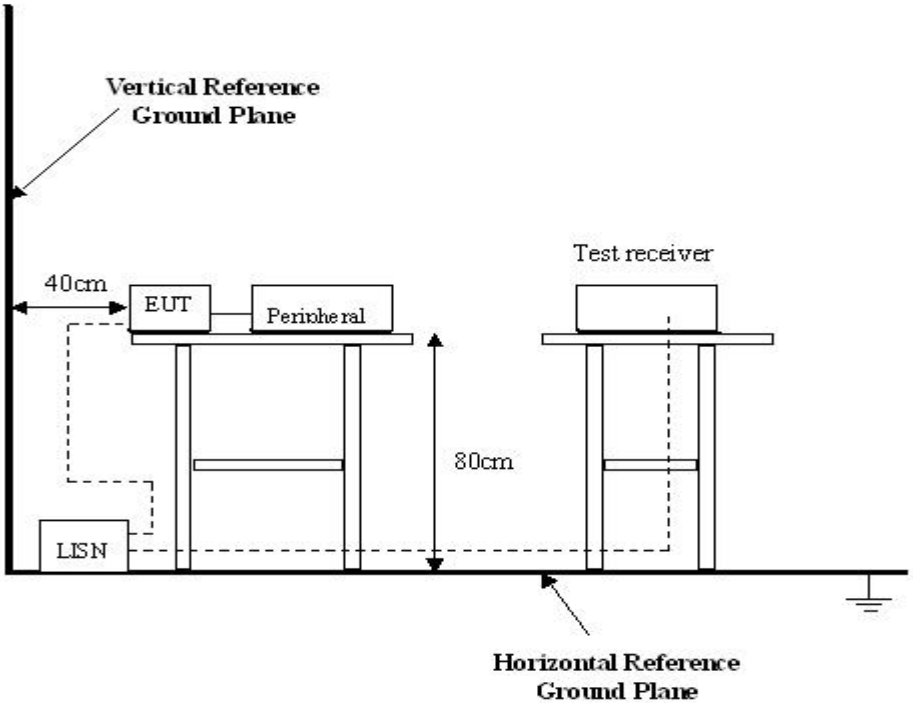
Please refer to Section 5 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4: 2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.3 Conducted Test Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



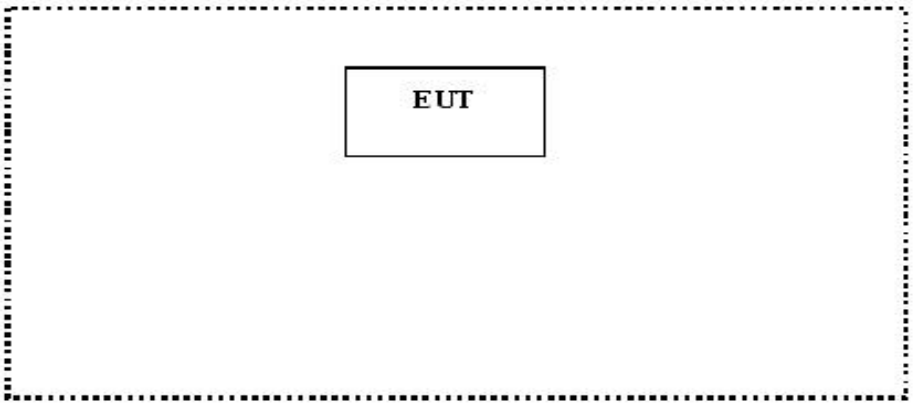
6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4: 2003.

A. Setup the EUT and simulators as shown on follow.

B. Enable RF signal and confirm EUT active.

C. Modulate output capacity of EUT up to specification.



6.5 Conducted Emission Limits

66-56 dBμV between 0.15MHz & 0.5MHz
56 dBμV between 0.5MHz & 5MHz
60 dBμV between 5MHz & 30MHz

Note: In the above limits, the tighter limit applies at the band edges.

6.6 Conducted Emission Test Data

Own to the EUT operation with battery, the test was not performed.

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7 Radiation Emission Test

Product Name:	Remote Controller
Test Requirement:	FCC Part15 Paragraph 15.231
Test Method:	Based on FCC Part15 Paragraph 15.33
Test Date:	Oct.18,2010
Frequency Range:	30MHz to 5GHz
Measurement Distance:	3m

7.1 Test Equipment

Please refer to Section 5 this report.

7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

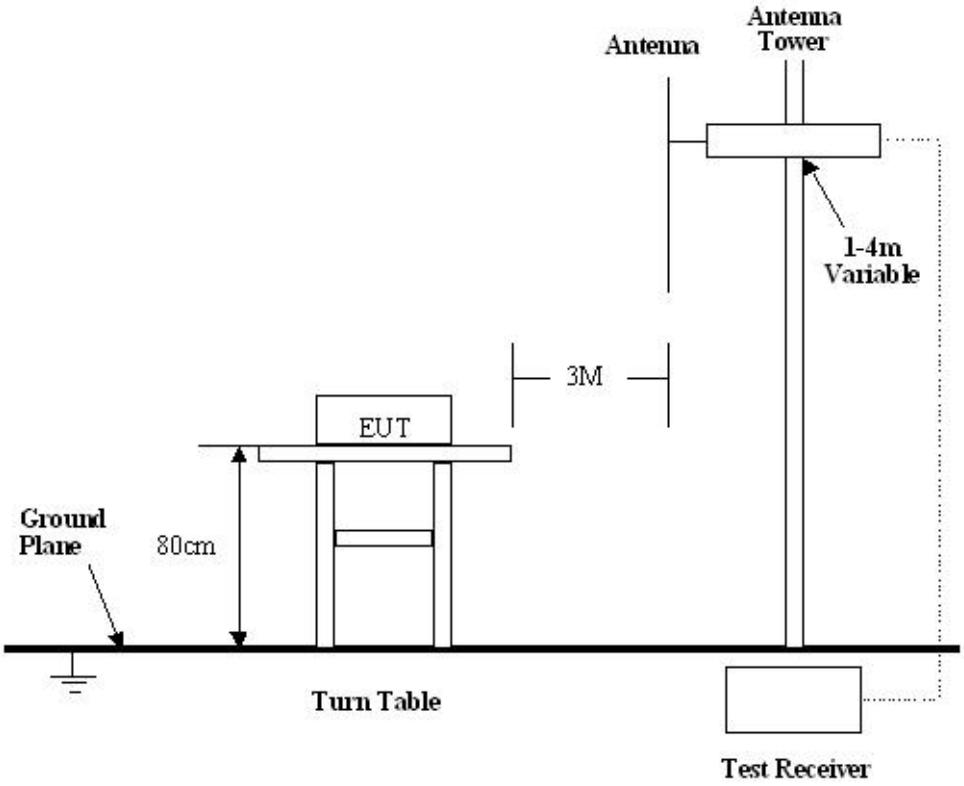
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC Lab is +/- 5.03 dB.

7.3 Test Procedure

1. New battery was used in the equipment under test for radiated emissions test.
2. The radiation emission should be tested under 3-axes position(lying,side and stand),After pre-test,It was found that the worse radiation emission was get at the lying position.
3. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
4. All data was recorded in the peak and average detection mode.
5. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.231, Paragraph 15.209 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.231 Rules, the system was tested to 5000 MHz.

Below 1GHz

Start Frequency.....30 MHz
Stop Frequency .....1000 MHz
Sweep Speed Auto
IF Bandwidth .....120 kHz
Video Bandwidth.....100 kHz
Quasi-Peak Adapter Bandwidth .....120 kHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth .....100 kHz

Above 1GHz

Start Frequency 1GHz
Stop Frequency 5GHz
Sweep Speed Auto
IF Bandwidth .....120 kHz
Video Bandwidth.....1 MHz
Quasi-Peak Adapter Bandwidth .....120 kHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth 1MHz

7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Class B Limit

7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.231 standards.

7.8 EUT Operating Condition

Same as section 6.4 of this report.

7.9 Radiated Emissions Limit

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	\1\ 1,250 to 3,750	\1\ 125 to 375
174-260	3,750	375
260-470	\1\ 3,750 to 12,500.	\1\ 375 to 1,250
Above 470	12,500	1,250

7.10 Radiated Emissions Test Result

Formula of conversion factors:the field strength at 3m was egtablished by adding
The meter reading of the spectrum analyer (which is set to read in units of dBuV)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stared in terms of dB.The gain of the pressletor was accounted
For in the spectrum analyser meter reading.

Example:

Freq(MHz)	Meter Reading +ACF=FS
33	20dBuV+10.36dB=30.36dBuV/m @3m

7.10.1 Radiated Emission Test Data

Test Item:	Radiated Emission Test Data
Test Voltage:	DC 3.0V
Test Mode:	TX On
Temperature:	25.5 °C
Humidity:	51%RH
Test Result:	PASS

Note:

AV = Peak+20Log$_{10}$(duty cycle) = Peak – 21.5

So the Radiated Emission Test Data as the table follow.For more details of the calculation , please refer the section 9 of the Periodic operation .

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
433.92	Peak	Vertical	94.75	100.82	6.07	1.1	0
433.92	Peak	Horizontal	91.81	100.82	9.01	1.0	60
867.831	Peak	Vertical	75.19	80.82	5.63	1.1	0
1301.76	Peak	Vertical	55.82	74.00	18.18	1.0	120
1735.58	Peak	Vertical	50.63	74.00	23.37	1.0	0
2169.6	Peak	Vertical	47.93	74.00	26.07	1.1	140
2603.52	Peak	Vertical	48.86	74.00	25.14	1.3	60
3037.44	Peak	Vertical	50.41	74.00	23.59	1.4	45
3471.36	Peak	Vertical	50.57	74.00	23.43	1.1	60
3905.28	Peak	Vertical	50.11	74.00	23.89	1.0	50
4339.2	Peak	Vertical	48.94	74.00	25.06	1.0	110
867.831	Peak	Horizontal	77.53	80.82	3.29	1.3	120
1301.76	Peak	Horizontal	57.74	74.00	16.26	1.2	45
1735.58	Peak	Horizontal	52.66	74.00	21.34	1.4	45
2169.6	Peak	Horizontal	54.52	74.00	19.48	1.2	90
2603.52	Peak	Horizontal	51.68	74.00	22.32	1.0	130
3037.44	Peak	Horizontal	49.87	74.00	24.13	1.0	40
3471.36	Peak	Horizontal	51.58	74.00	22.42	1.3	60
3905.28	Peak	Horizontal	46.31	74.00	27.69	1.1	110
4339.2	Peak	Horizontal	49.39	74.00	24.61	1.3	10
433.92	AV	Vertical	73.25	80.82	7.57	1.0	90
433.92	AV	Horizontal	70.31	80.82	10.51	1.1	0
867.831	AV	Vertical	53.69	60.82	7.13	1.1	0
1301.76	AV	Vertical	34.32	54.00	19.68	1.0	60
1735.58	AV	Vertical	29.13	54.00	24.87	1.0	120
2169.6	AV	Vertical	26.43	54.00	27.57	1.1	60
2603.52	AV	Vertical	27.36	54.00	26.64	1.1	140
3037.44	AV	Vertical	28.91	54.00	25.09	1.3	60
3471.36	AV	Vertical	29.07	54.00	24.93	1.1	45
3905.28	AV	Vertical	28.61	54.00	25.39	1.0	60
4339.2	AV	Vertical	27.44	54.00	26.56	1.1	45
867.831	AV	Horizontal	56.03	60.82	4.79	1.1	110

1301.76	AV	Horizontal	36.24	54.00	17.76	1.1	10
1735.58	AV	Horizontal	31.16	54.00	22.84	1.0	135
2169.6	AV	Horizontal	33.02	54.00	20.98	1.1	90
2603.52	AV	Horizontal	30.18	54.00	23.82	1.0	130
3037.44	AV	Horizontal	28.37	54.00	25.63	1.0	40
3471.36	AV	Horizontal	30.08	54.00	23.92	1.3	60
3905.28	AV	Horizontal	24.81	54.00	29.19	1.1	110
4339.2	AV	Horizontal	27.89	54.00	26.11	1.3	140

Where F is the frequency in MHz,The formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1). For the band 130-174MHz,uV/m at 3 meters=56.81818(F)-6136.3636;

(2). For the band 260-470MHz,uV/m at 3 meters=41.6667(F)-7083.3333.

Sample calculation of limit @ 433.92MHz

41.6667 (433.92)- 7083.3333=10996.681uV/m

20log(10996.681)=80.82 dBuV/m(AV) limit @ 433.92MHz

And

The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

AV = Peak +20Log_{10}(duty cycle)

8 Antenna Requirement.

According to the FCC Part 15 Paragraph 15.203, 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 to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section

9 Periodic Operation

The duty cycle was determined by the following equation:
To calculate the actual field intensity,The duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion

Duty Cycle(%)=
Total On interval in a complete pulse train/ Length of a complete pulse train * %

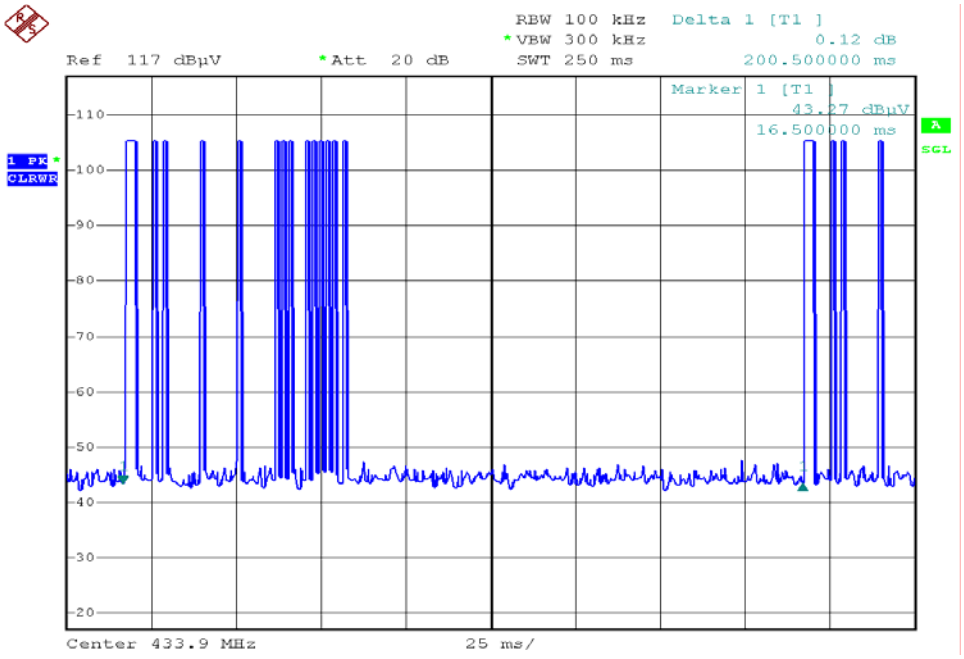
Duty Cycle Correction Factor(dB)=20 * Log_{10}(Duty Cycle(%))

Pulse Train	Number of Pulse	T(ms)	Total Time(ms)
Long Pulse	1	3.08	3.08msec
Short Pulse	13	1.06	13.78msec

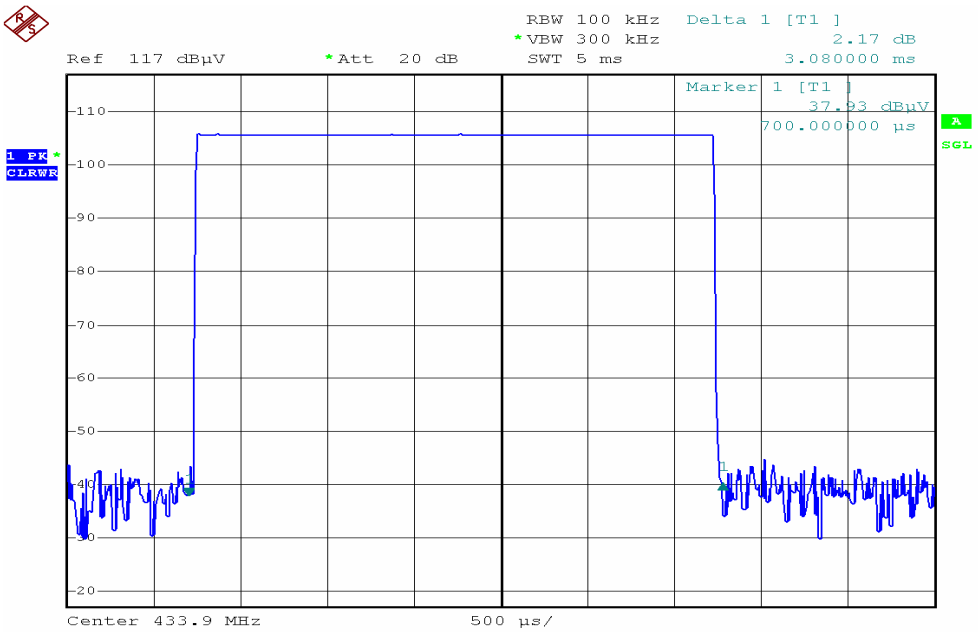
Total On interval in a complete pulse train	200.5msec
Length of a complete pulse train	16.86msec
Duty Cycle(%)	8.41%
Duty Cycle Correction Factor(dB)	-21.5

Refer to the duty cycle plot (as below),This device does meet the FCC requirement.

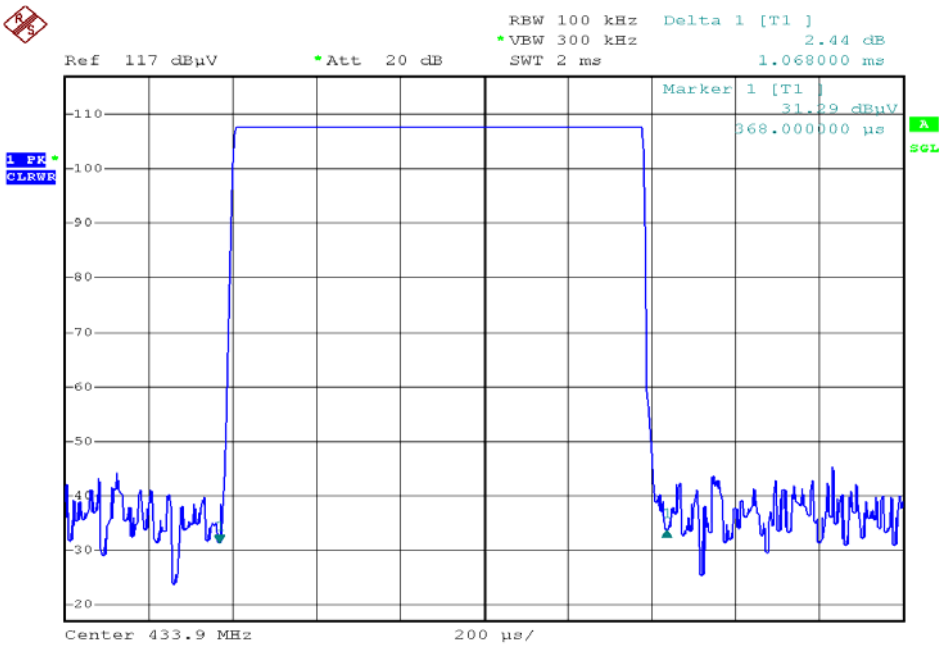
Length of a complete pulse train:



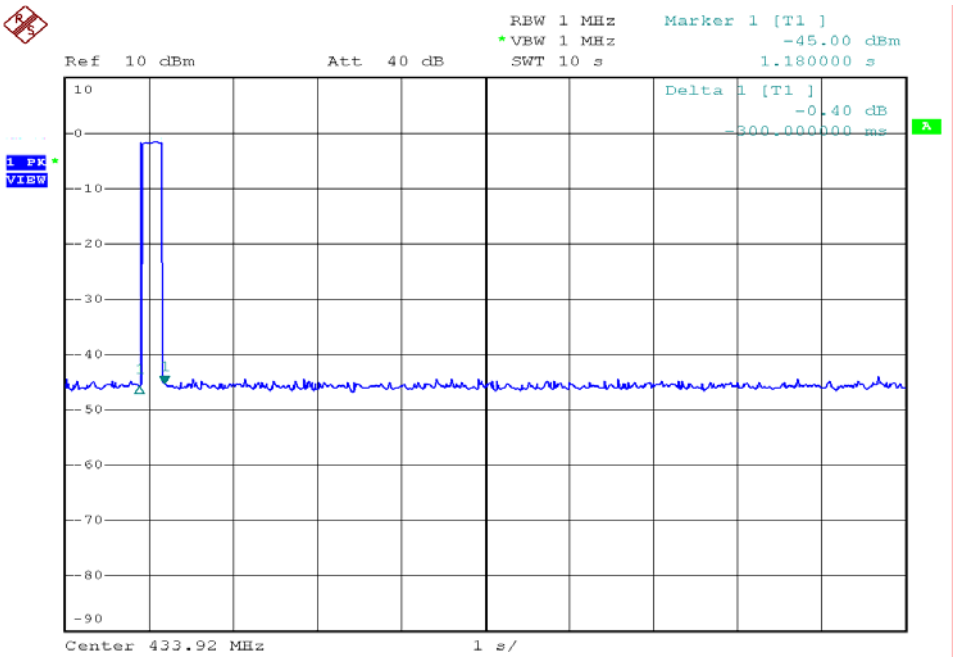
Long Pulse



Short Pulse:



Refer to the plot (as below),We find a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter is 300ms, within not more than 5 seconds of being released.



10 Band Edge

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 Paragraph 15.231
Test Date:	Oct.18,2010
Test mode:	TX On
Temperature:	25.5 °C
Humidity:	51%RH

10.1 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.EUT and its simulators are placed on a table, let EUT working in test mode,then test it.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100KHz RBW and 100KHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

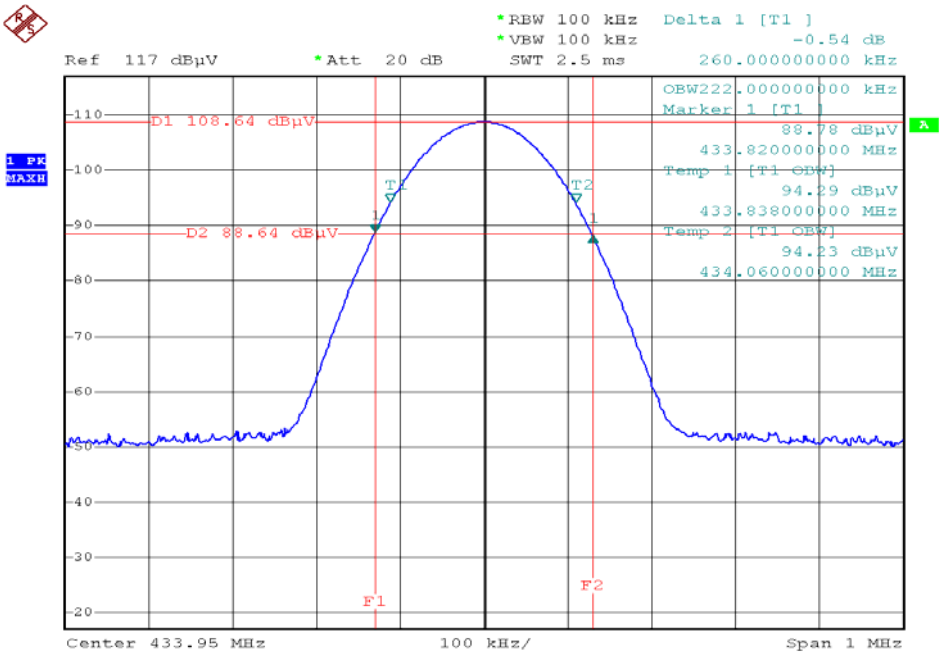
10.2 Band Edge

Requirements: The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. 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.

Frequency (MHz)	Bandwidth Emission (KHz)	Limit (KHz)	Result
433.92	260.00	1084.8	Pass

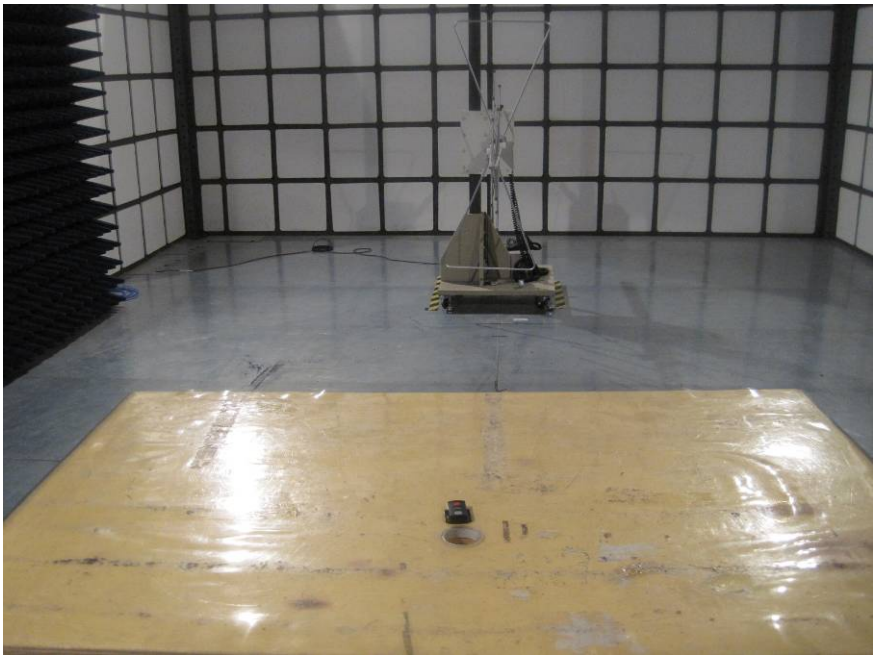
10.3 Band Edge Test Result

433.92MHz TX

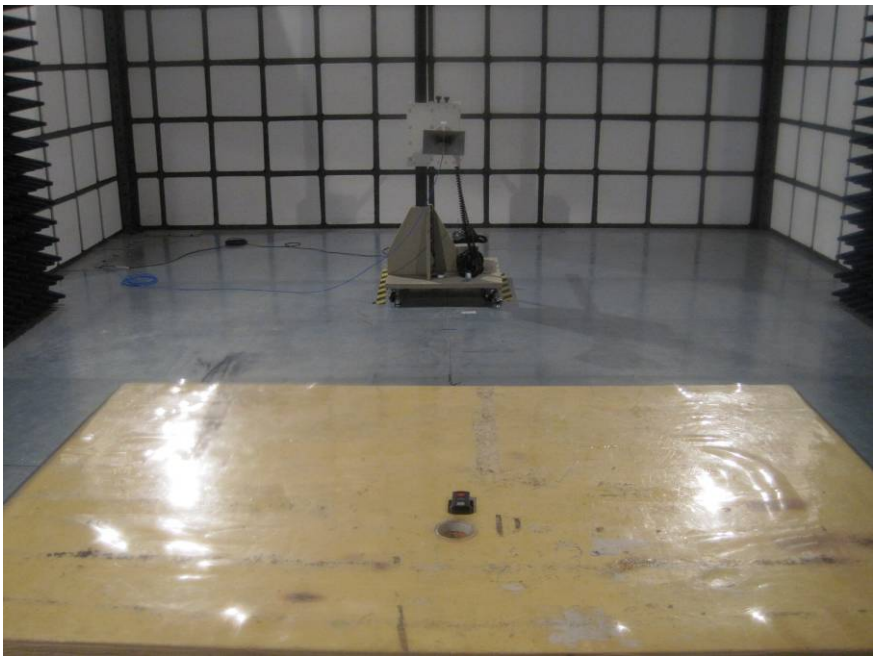


11 Photographs of Testing

11.1 Radiation Emission Test View For 30MHz-1000MHz



11.2 Radiation Emission Test View For 1GHz-5GHz

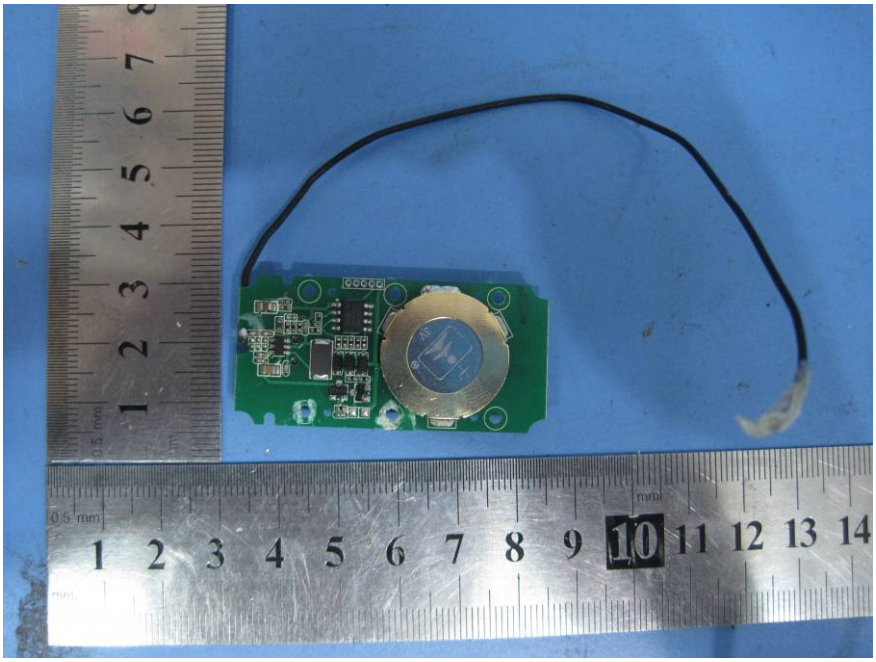


12 Photographs - Constructional Details

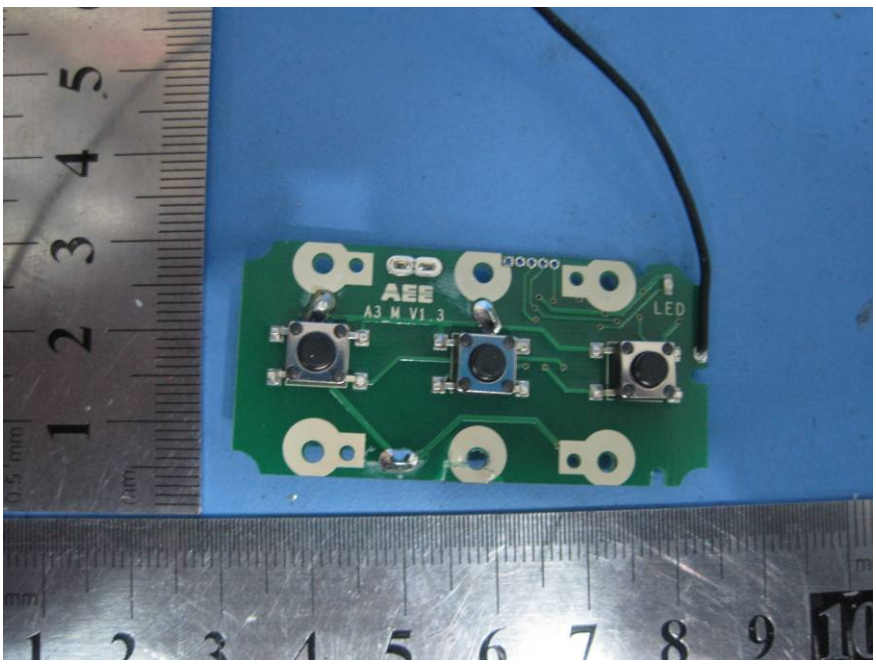
12.1 EUT-Front View

12.2 EUT-Back View

12.3 PCB-Front View



12.4 PCB-Back View



13 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference,and (2) this device must accept any interference received, including interference that may cause undesired operation

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Bottom View/proposed FCC Label Location