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No.: HM164590

Organix Concept Ltd **Applicant (LET009):** 

Unit 504, East Town Building, 41 Lockhart Road, Wanchai,

Hong Kong

Manufacturer: Million Concept Electronic (ShenZhen) Ltd

No. 98, Xiashanmen Road, Songgang Town, Baoan District,

Shenzhen

**Description of Sample(s):** Submitted sample(s) said to be

> Product: Origo Sportsman's Weather Station Origo Sportsman's Weather Station **Brand Name:**

Model Number: WT015 FCC ID: XXUWT015

**Date Sample(s) Received:** 2009-11-19

**Date Tested:** 2009-11-27

**Investigation Requested:** Perform ElectroMagnetic Interference measurement in

> accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2008 and ANSI C63.4:2003 for FCC Certification.

The submitted product COMPLIED with the requirements of **Conclusion(s):** 

> Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this

Test Report.

Remark(s):

Dr. LEE Kam Chuen Authorized Signatory

ElectroMagnetic Compatibility Department

For and on behalf of

The Hong Kong Standards and Testing Centre Ltd



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## 1.0 General Details

# 1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd. EMC Laboratory 10 Dai Wang Street, Taipo Industrial Estate New Territories, Hong Kong

Telephone: 852 2666 1888 Fax: 852 2664 4353

# 1.2 Applicant Details Applicant

Organix Concept Ltd Unit 504, East Town Building, 41 Lockhart Road, Wanchai, Hong Kong

## Manufacturer

Million Concept Electronic (ShenZhen) Ltd No. 98, Xiashanmen Road, Songgang Town, Baoan District, Shenzhen



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# 1.3 Equipment Under Test [EUT] Description of Sample

Submitted sample(s) said to be

Product: Origo Sportsman's Weather Station
Manufacturer: Million Concept Electronic (ShenZhen) Ltd

Brand Name: Origo Sportsman's Weather Station

Model Number: WT015

Rating: 3Vd.c. ("AAA" size battery x 2)

#### 1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Organix Concept Ltd, Origo Sportsman's Weather Station. The EUT is a periodic transmitter, When the batteries are inserted for the first time, the remote sensor will send information to the Receiver Unit automatically. The transmission signal modulated by IC; and the type is pulse modulation.

## 1.4 Date of Order

2009-11-19

## 1.5 Submitted Sample(s):

1 Sample

#### 1.6 Test Duration

2009-11-27

## 1.7 Country of Origin

China



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## 2.0 Technical Details

# 2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2008 and ANSI C63.4:2003 for FCC Certification.

## 2.2 Test Standards and Results Summary Tables

| EMISSION<br>Results Summary                                        |                   |                 |          |             |             |     |  |
|--------------------------------------------------------------------|-------------------|-----------------|----------|-------------|-------------|-----|--|
| Test Condition Test Requirement Test Method Class /                |                   |                 |          |             | Test Result |     |  |
|                                                                    |                   |                 | Severity | Pass        | Failed      | N/A |  |
| Field Strength of<br>Fundamental Emissions<br>& Spurious Emissions | FCC 47CFR 15.231e | ANSI C63.4:2003 | N/A      | $\boxtimes$ |             |     |  |
| Radiated Emissions,<br>30MHz to 1GHz                               | FCC 47CFR 15.209  | ANSI C63.4:2003 | N/A      | $\boxtimes$ |             |     |  |

Note: N/A - Not Applicable



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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions (30 – 1000MHz)

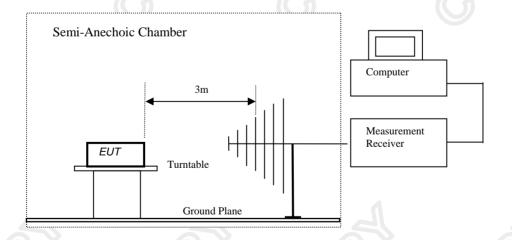
Test Requirement: FCC 47CFR 15.231e
Test Method: ANSI C63.4:2003
Test Date: 2009-11-27
Mode of Operation: Tx on mode

#### **Test Method:**

The sample was placed 0.8m above the ground plane of semi-anechoic Chamber\*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

\*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

## **Test Setup:**





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#### Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231e]:

| Frequency Range of | Field Strength of    | Field Strength of |  |  |
|--------------------|----------------------|-------------------|--|--|
| Fundamental        | Fundamental Emission | Spurious Emission |  |  |
|                    | [Average]            | [Average]         |  |  |
| [MHz]              | $[\mu V/m]$          | $[\mu V/m]$       |  |  |
| 40.66-40.70        | 1,000                | 100               |  |  |
| 70-130             | 500                  | 50                |  |  |
| 130-174            | 500 to 1,500 **      | 50 to 150 **      |  |  |
| 174-260            | 1,500                | 150               |  |  |
| 260-470            | 1,500 to 5,000 **    | 150 to 500 **     |  |  |
| Above 470          | 5,000                | 500               |  |  |

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,  $\mu V/m$  at 3 meters = 22.72727(F) - 2454.545; for the band 260-470 MHz,  $\mu V/m$  at 3 meters = 16.6667(F) - 2833.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

#### Results of Tx on mode: PASS

|           | Field Strength of Fundamental Emissions |            |          |          |          |            |  |  |
|-----------|-----------------------------------------|------------|----------|----------|----------|------------|--|--|
| 1         | Peak Value                              |            |          |          |          |            |  |  |
| Frequency | Measured                                | Correction | Field    | Field    | Limit    | E-Field    |  |  |
|           | Level @3m                               | Factor     | Strength | Strength | @3m      | Polarity   |  |  |
| MHz       | dΒμV                                    | dB/m       | _dBμV/m_ | μV/m     | μV/m_    |            |  |  |
| 433.9     | 60.7                                    | 18.5       | 79.2     | 9,120.1  | 43,983.5 | Horizontal |  |  |
| 867.8     | 25.9                                    | 25.7       | 51.6     | 380.2    | 4,398.3  | Horizontal |  |  |
| + 1301.7  | 32.3                                    | 28.1       | 60.4     | 1,047.1  | 5,000.0  | Horizontal |  |  |
| 1735.6    | 30.5                                    | 29.5       | 60.0     | 1,000.0  | 5,000.0  | Horizontal |  |  |
| 1887.2    | 8.1                                     | 30.1       | 38.2     | 81.3     | 5,000.0  | Horizontal |  |  |
| 2169.6    | 18.0                                    | 31.2       | 49.2     | 288.4    | 5,000.0  | Horizontal |  |  |
| 2603.5    | 8.2                                     | 32.5       | 40.7     | 108.4    | 5,000.0  | Horizontal |  |  |
| 3037.3    | 1.0                                     | 26.5       | 27.5     | 23.7     | 5,000.0  | Horizontal |  |  |
| 3471.3    | 0.5                                     | 34.9       | 35.4     | 58.9     | 5,000.0  | Horizontal |  |  |
| + 3905.1  | 1.0                                     | 26.5       | 27.5     | 23.7     | 5,000.0  | Horizontal |  |  |
| + 4339.00 | 1.0                                     | 26.5       | 27.5     | 23.7     | 5,000.0  | Horizontal |  |  |

#### Remarks:

FCC Limit for Fundamental Average Measurement =  $16.6667(433.93)-2833.333=4398.8\mu V/m$ 

+: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limits of FCC Rules Part 15 Section 15.209 were applied.

\*: Adjusted by Duty Cycle = -6.7dB

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB

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Results of Tx on mode: PASS

| 4         | Fi        | eld Strength | of Fundamer  | ntal Emissions |         |            |
|-----------|-----------|--------------|--------------|----------------|---------|------------|
|           |           | A            | verage Value |                |         |            |
| Frequency | Measured  | Correction   | Field        | Field          | Limit   | E-Field    |
|           | Level @3m | Factor       | Strength     | Strength       | @3m     | Polarity   |
| MHz       | dΒμV      | dB/m         | dBμV/m       | μV/m           | μV/m    |            |
| * 433.9   | 54.0      | 18.5         | 72.5         | 4,217.0        | 4,398.3 | Horizontal |
| * 867.8   | 19.2      | 25.7         | 44.9         | 175.8          | 439.8   | Horizontal |
| *+ 1301.7 | 25.6      | 28.1         | 53.7         | 484.2          | 500.0   | Horizontal |
| * 1735.6  | 23.8      | 29.5         | 53.3         | 462.4          | 500.0   | Horizontal |
| * 1887.2  | 1.4       | 30.1         | 31.5         | 37.6           | 500.0   | Horizontal |
| * 2169.6  | 11.3      | 31.2         | 42.5         | 133.4          | 500.0   | Horizontal |
| * 2603.5  | 1.5       | 32.5         | 34.0         | 50.1           | 500.0   | Horizontal |
| 3037.3    | 1.0       | 33           | 34.0         | 50.1           | 500.0   | Horizontal |
| * 3471.3  | -6.2      | 34.9         | 28.7         | 27.2           | 500.0   | Horizontal |
| + 3905.1  | 1.0       | 26.5         | 27.5         | 23.7           | 500.0   | Horizontal |
| + 4339.00 | 1.0       | 26.5         | 27.5         | 23.7           | 500.0   | Horizontal |

#### Remarks:

FCC Limit for Fundamental Average Measurement =  $16.6667(433.93)-2833.3333=4398.8 \mu V/m$ 

+: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limits of FCC Rules Part 15 Section 15.209 were applied.

\*: Adjusted by Duty Cycle = -6.7dB

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB





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## Limits for Radiated Emissions [FCC 47 CFR 15.209]:

| Frequency Range [MHz] | Quasi-Peak Limits<br>[μV/m] |  |  |
|-----------------------|-----------------------------|--|--|
| 30-88                 | 100                         |  |  |
| 88-216                | 150                         |  |  |
| 216-960               | 200                         |  |  |
| Above960              | 500                         |  |  |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

#### Results of Tx on mode: PASS

| Field Strength of Fundamental Emissions                     |                                                         |        |          |          |     |          |  |  |
|-------------------------------------------------------------|---------------------------------------------------------|--------|----------|----------|-----|----------|--|--|
|                                                             | Peak Value                                              |        |          |          |     |          |  |  |
| Frequency                                                   | Frequency Measured Correction Field Field Limit E-Field |        |          |          |     |          |  |  |
| Level @3m                                                   |                                                         | Factor | Strength | Strength | @3m | Polarity |  |  |
| MHz $dB\mu V$ $dB/m$ $dB\mu V/m$ $\mu V/m$ $\mu V/m$        |                                                         |        |          |          |     |          |  |  |
| Emissions detected are more than 20 dB below the FCC Limits |                                                         |        |          |          |     |          |  |  |

## Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30MHz

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB



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#### 3.2 20dB Bandwidth of Fundamental Emission

Test Requirement: FCC 47 CFR 15.231e

Test Method: ANSI C63.4:2003 (Section 13.1.7)

Test Date: 2009-11-27 Mode of Operation: On mode

#### **Test Method:**

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

## **Test Setup:**

As Test Setup of clause 3.1.1 in this test report.



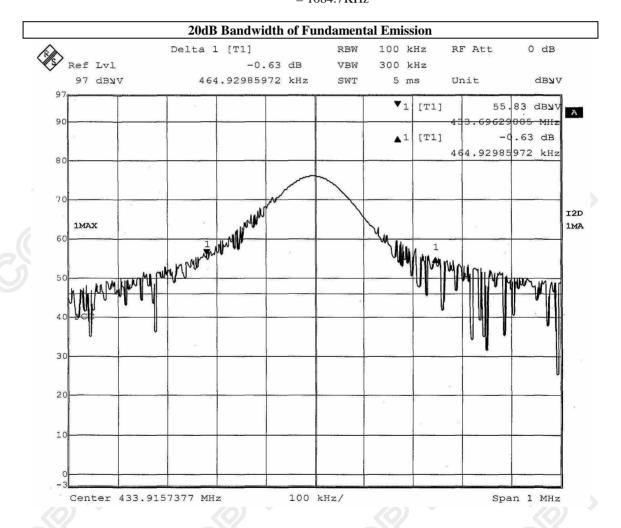
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#### Limits for 20 dB Bandwidth of Fundamental Emission:

| Ī | Frequency Range [MHz] | 20dB Bandwidth | FCC Limits * [KHz] |
|---|-----------------------|----------------|--------------------|
| ŀ | 433.9                 | 464.93         | 1084.7             |

\*: FCC Limit for Bandwidth measurement = (0.25%)(Center Frequency) =(0.0025)(433.9) = 1084.7KHz





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## Appendix A

## List of Measurement Equipment

## **Radiated Emission**

|         | 111111111111111111111111111111111111111 |                 |              |               |            |            |  |  |
|---------|-----------------------------------------|-----------------|--------------|---------------|------------|------------|--|--|
| EQP NO. | DESCRIPTION                             | MANUFACTURER    | MODEL<br>NO. | SERIAL<br>NO. | LAST CAL   | DUE CAL    |  |  |
| EMD062  | HORN ANTENNA                            | EMCO            | 3117         | 0075933       | 2008/11/06 | 2010/11/06 |  |  |
| EM215   | MULTIDEVICE CONTROLER                   | EMCO            | 2090         | 00024676      | N/A        | N/A        |  |  |
| EM216   | MINI MAST SYSTEM                        | EMCO            | 2075         | 00026842      | N/A        | N/A        |  |  |
| EM217   | ELECTRIC POWERED<br>TURNTABLE           | EMCO            | 2088         | 00029144      | N/A        | N/A        |  |  |
| EM218   | ANECHOIC CHAMBER                        | ETS-Linggren    | FACT-3       |               | 2008/12/01 | 2011/12/01 |  |  |
| EM174   | BICONILOG ANTENNA                       | EMCO            | 3142B        | 1671          | 2008/01/24 | 2010/01/24 |  |  |
| EM181   | EMI TEST RECEIVER                       | ROHDE & SCHWARZ | ESIB7        | 100072        | 2009/06/29 | 2010/06/29 |  |  |
| EM022   | LOOP ANTENNA                            | EMCO            | 6502         | 1189-2424     | 2009/07/26 | 2011/07/26 |  |  |

#### Remarks:-

CM Corrective Maintenance

N/A Not Applicable or Not Available

**TBD** To Be Determined



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#### Appendix B

## **Duty Cycle Correction During 100msec**

The transmitter periodically sends a different series of characters, but each packet period (100msec) never exceeds a series of 1 long (2.61msec), 16 medium (1.71msec) and 20 short (0.812msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered (1x2.61msec)+(16x1.71msec)+(20x0.812msec) per 100msec=46.2% duty cycle. Figure A through F show the characteristics of the pulses train for one of these functions.

#### Remarks:

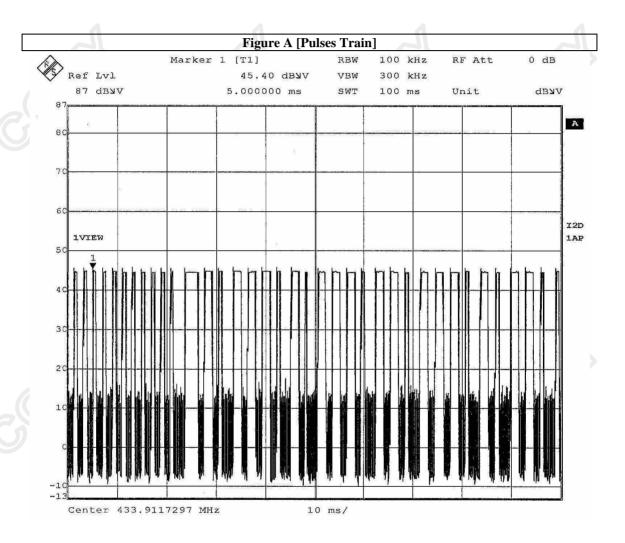
Duty Cycle Correction = 20log (0.4621)=-6.7dB

The following figures [Figure A to Figure F] showed the characteristics of the pulse train for one of these functions.



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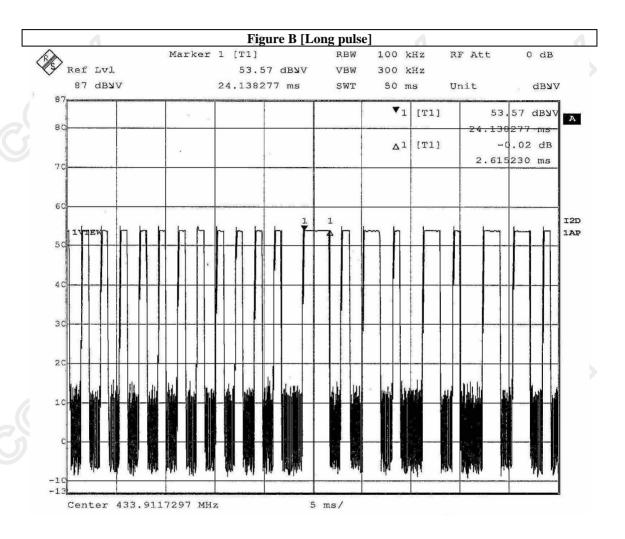
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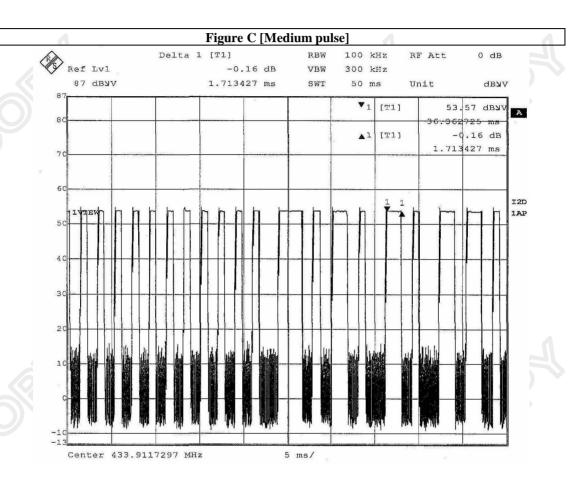
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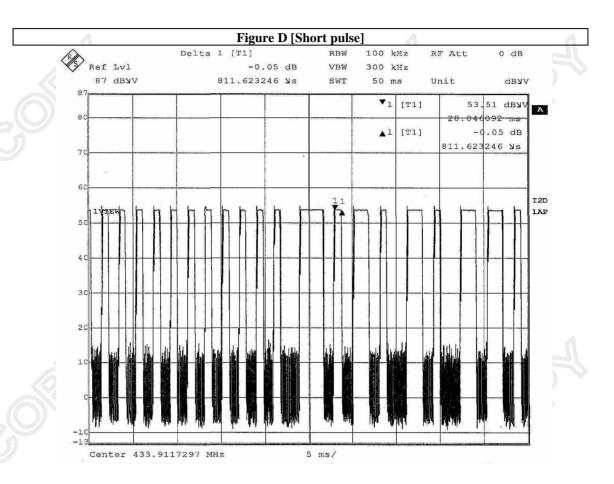
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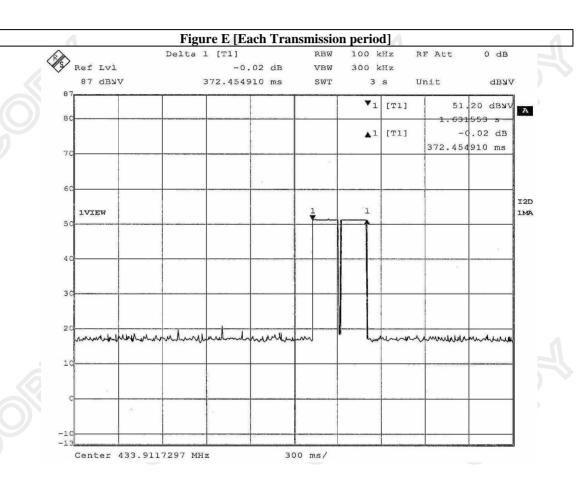
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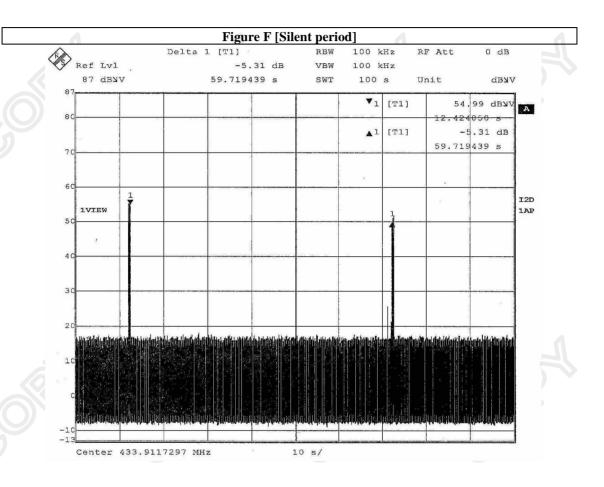
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## Appendix C

# Periodic Operation [FCC 47CFR 15.231(e)]

According to FCC 47CFR15.231 (e). A periodic transmitter shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.



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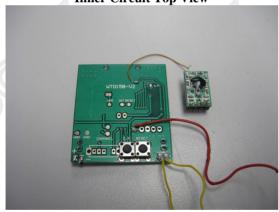
## Appendix D

## Photographs of EUT

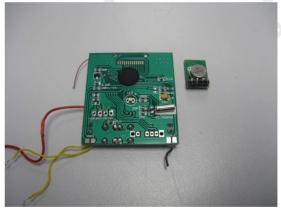




**Inner Circuit Top View** 



**Inner Circuit Bottom View** 

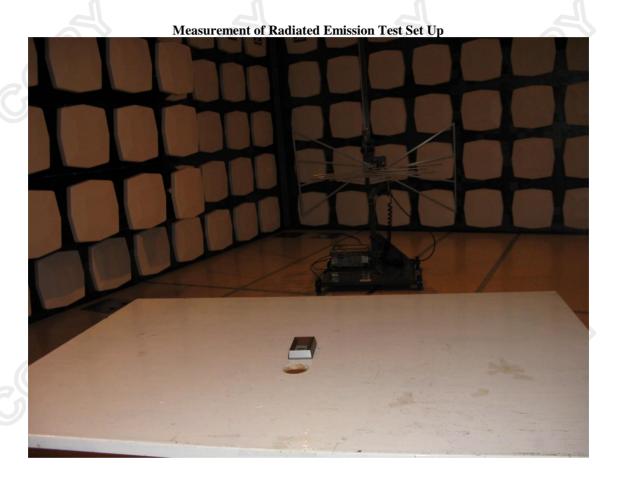




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# **Photographs of EUT**



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

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