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**FEDERAL COMMUNICATIONS COMMISSION**  
Registration number: 556682

Report No.: SZEMO09040196101  
Page: 1 of 16

## TEST REPORT

**Application No.:** SZEMO090401961RF  
**Applicant:** SUNWAY ELECTRONICS COMPANY  
**Manufacturer/ Factory:** SUNWAY ELECTRONICS COMPANY  
**FCC ID:** VN2-SUN0906  
**Fundamental Frequency :** 433.99 MHz  
**Equipment Under Test (EUT):**  
Name: Clock-Sound Centre-DE-MS/ Clock-Sound Centre-MS/  
Thermometer-Dig In/Out-DE-MS/ Therm-Dig In-Outdoor II-S3-MS  
Model No.: 1626283(DG601C), 1617033(DG602C),  
1626282(DG603C), 1624965(DG605C) ♣  
♣ Please refer to section 2 of this report which indicates which item was  
actually tested and which were electrically identical.  
**Standards:** FCC PART 15, SUBPART C : 2008 (Section 15.231)  
**Date of Receipt:** 29 April 2009  
**Date of Test:** 29 April to 26 May 2009  
**Date of Issue:** 27 May 2009

<b>Test Result :</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo  
Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
<b>Radiated Emission (30MHz to 5000MHz)</b>	FCC PART 15 : 2008	Section 15.231	PASS
<b>Dwell time</b>	FCC PART 15 : 2008	Section 15.231	PASS
<b>Occupied Bandwidth</b>	FCC PART 15 : 2008	Section 15.215	PASS

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

Remark:

Item No.: 1626283(DG601C), 1617033(DG602C), 1626282(DG603C), 1624965(DG605C)

Only the Item 1624965(DG605C)/ 1617033(DG602C) were tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above items, with only difference being the outer decoration.



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## **4 General Information**

### **4.1 Client information**

Applicant: SUNWAY ELECTRONICS COMPANY  
Manufacturer/ Factory: SUNWAY ELECTRONICS COMPANY  
Address of Applicant: Rm1710, Nan Fung Centre 264-298 Castle Peak Rd., Tusuen Wan, N.T Hong Kong  
Address of Manufacturer: Shiting Jiangkou Township Putian City Fujian Province China  
Address of Factory: Shiting Jiangkou Township Putian City Fujian Province China

### **4.2 Details of E.U.T**

Name: Clock-Sound Centre-DE-MS/ Clock-Sound Centre-MS/  
Thermometer-Dig In/Out-DE-MS/ Therm-Dig In-Outdoor II-S3-MS  
Model No.: 1626283(DG601C), 1617033(DG602C),  
1626282(DG603C), 1624965(DG605C)  
Power Supply: DC3.0V(2\*1.5V"AAA"Size Batteries)  
Power Cord: N/A-

### **4.3 Description of Support Units**

The EUT was tested as an independent unit: a 433 MHz Remote Control

### **4.4 Test Location**

All tests were performed at:

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, District Shenzhen, China 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

### **4.5 Other Information Requested by the Customer**

None.

## 4.6 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

The 3m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197 and C-2383 respectively.

Date of Registration: September 29, 2008. Valid until September 28, 2011.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 556682, June 27, 2008.

- **Industry Canada (IC)**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1.



## 5 Test Results

### 5.1 Test Instruments

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	16-06-2008	15-06-2010
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	12-12-2008	11-12-2009
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	18-06-2009	17-06-2010
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0014	12-08-2008	11-08-2009
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	18-06-2009	17-06-2010
7	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0005	12-08-2008	11-08-2009
8	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	12-08-2008	11-08-2009
9	Pre-amplifier (1-18GHz)	Rohde & Schwarz	AFS42-00101 800-25-S-42	SEL0081	18-06-2009	17-06-2010
10	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33- 18002650-30- 8P-44	SEL0080	18-06-2009	17-06-2010
11	Band filter	Amindeon	82346	SEL0094	18-06-2009	17-06-2010
12	Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	15-06-2009	14-06-2010

## 5.2 E.U.T. Operation

Operating Environment:

Temperature: 24.0 °C

Humidity: 52 % RH

Atmospheric Pressure: 1010 mbar

## 5.3 Test Procedure & Measurement Data

### 5.3.1 Radiated Emissions

**Test Requirement:** FCC Part15 C Section 15.231, 15.209

**Test Method:** ANSI C63.4

**Measurement Distance:** 3m (Semi-Anechoic Chamber and OATS)

**Test mode:** Keep the EUT in transmitting mode.

**Frequency range:** 30 MHz – 5.0GHz

**Receiver setup:** RBW=120kHz VBW=300KHz (30MHz to 1000MHz)

RBW=1MHz VBW=3MHz (Above 1GHz)

**Limit:**

According to FCC 15.231(e) requirement:

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

**Fundamental and harmonics emission limits**

Fundamental Frequency MHz	Field Strength of Fundamental (dBμV/m @ 3m)	Field Strength of Harmonics and Spurious Emissions (dBμV/m @ 3m)
433.99	72.87	52.87

Remark: The table above tighter limit applies at the band edges.



**Test Procedure:**

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. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

An initial pre-scan was performed in the 3m chamber using the spectrum analyzer in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bilog antenna with 2 orthogonal polarities.

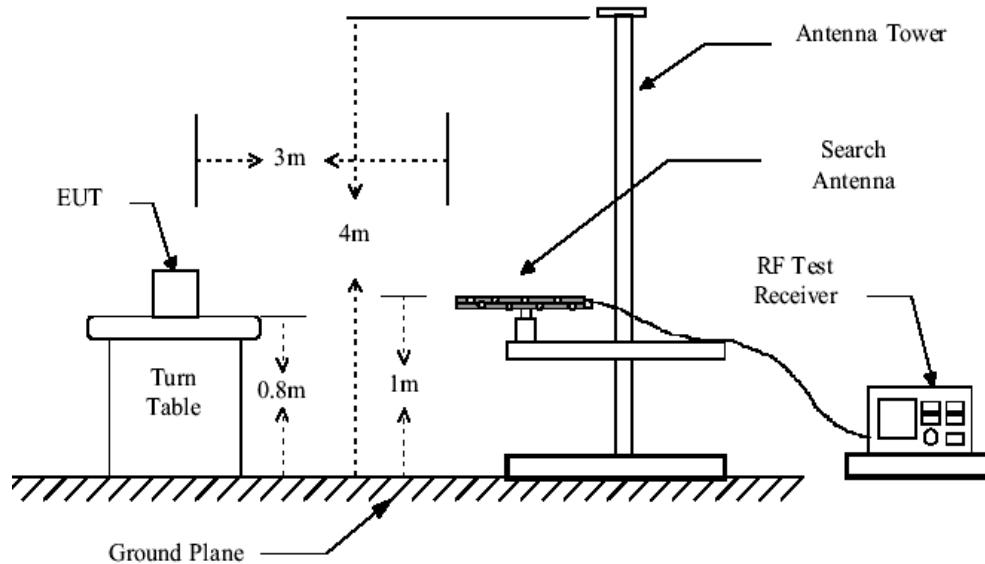
The following test results were performed on the EUT:

1. Fundamental emission

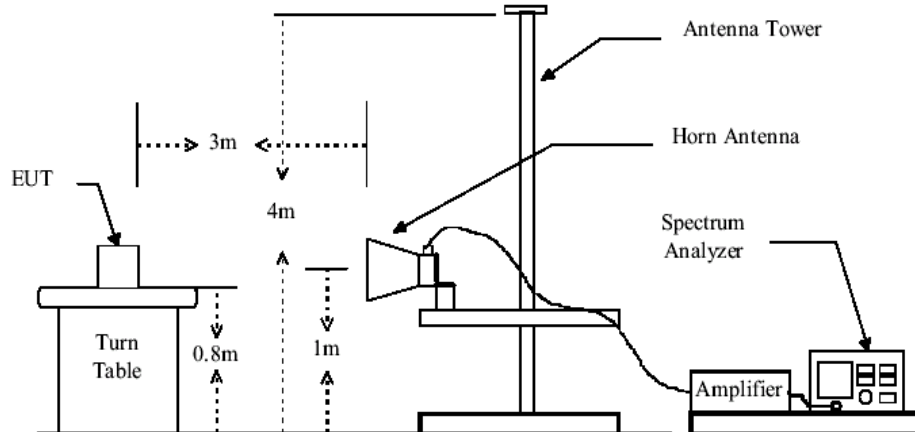


### Configuration of Measurement:

#### Below 1GHz



#### Above 1GHz





**Field Strength of Fundamental**

**Peak value:**

Test Frequency (MHz)	Peak (dB $\mu$ V/m)		Limits (dB $\mu$ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
433.99MHz	55.40	35.69	92.87	37.47	57.18

**Average value:**

Average value = Peak value + PDCF

Ton time = 0.5ms

Duty cycle = Ton time / T period =  $0.5 \times 31 \text{ms} / 100 \text{ms} = 0.155$

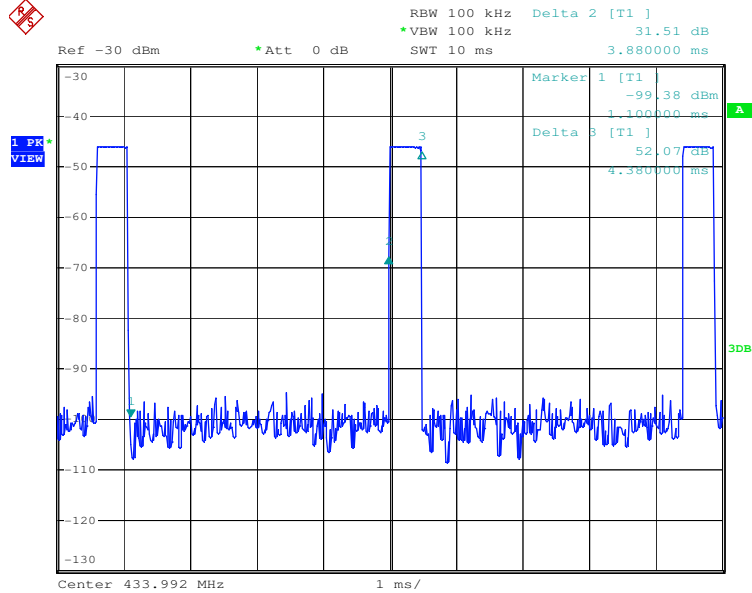
PDCF =  $20 \log(\text{Duty cycle}) = 20 \times (-0.943) = -16.19$

Average value =  $55.40 - 16.19 = 39.21 \text{dB}\mu\text{V/m}$

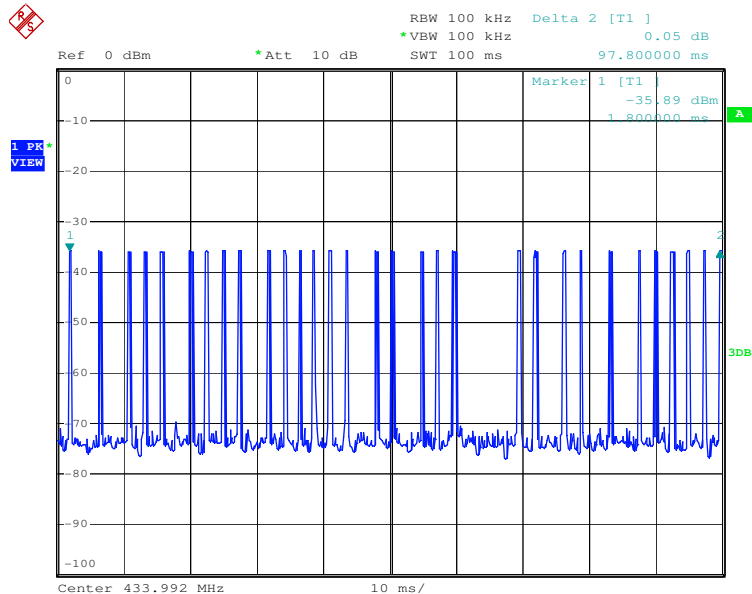
Please see the diagrams below:



Time slot:



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**Test Frequency 30MHz- 1GHz**

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
37.760	0.60	11.95	28.11	29.53	13.97	40.00	-26.03
66.860	0.80	6.99	28.01	29.91	9.69	40.00	-30.31
110.510	1.23	8.57	27.77	30.28	12.31	43.50	-31.19
180.350	1.37	9.91	27.26	30.50	14.52	43.50	-28.98
777.870	3.14	22.01	27.01	32.25	30.39	46.00	-15.61

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
85.290	1.10	8.26	27.97	29.79	11.18	40.00	-28.82
106.630	1.22	8.77	27.81	30.44	12.62	43.50	-30.88
179.380	1.37	9.87	27.26	31.21	15.19	43.50	-28.31
264.740	1.74	12.61	26.85	31.39	18.89	46.00	-27.11
731.310	3.00	21.62	27.17	31.40	28.85	46.00	-17.15

**Test frequency above 1GHz****Peak measurement**

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1315	3.50	27.67	37.74	37.81	31.24	74.00	-42.76	V
1790	4.15	30.36	37.95	36.52	33.08	74.00	-40.92	V
2395	4.97	32.24	37.97	36.58	35.82	74.00	-38.18	V
3025	5.11	33.39	37.50	36.21	37.21	74.00	-36.79	V
3395	5.53	33.24	37.54	35.84	37.07	74.00	-36.93	V
1230	3.37	27.61	37.39	37.81	31.40	74.00	-42.60	H
1720	4.06	29.82	37.97	37.84	33.75	74.00	-40.25	H
2425	5.01	32.26	38.06	37.89	37.10	74.00	-36.90	H
3360	5.50	33.25	37.53	37.18	38.40	74.00	-35.60	H
4550	6.50	34.09	38.34	36.65	38.90	74.00	-35.10	H

**Average measurement**

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1315	3.50	27.67	37.74	35.44	28.87	54.00	-25.13	V
1790	4.15	30.36	37.95	34.11	30.67	54.00	-23.33	V
2395	4.97	32.24	37.97	32.98	32.22	54.00	-21.78	V
3025	5.11	33.39	37.50	33.78	34.78	54.00	-19.22	V
3395	5.53	33.24	37.54	34.56	35.79	54.00	-18.21	V
1230	3.37	27.61	37.39	32.49	26.08	54.00	-27.92	H
1720	4.06	29.82	37.97	35.58	31.49	54.00	-22.51	H
2425	5.01	32.26	38.06	33.67	32.88	54.00	-21.12	H
3360	5.50	33.25	37.53	35.49	36.71	54.00	-17.29	H
4550	6.50	34.09	38.34	30.89	33.14	54.00	-20.86	H



According to the standards used, where limits are specified by agencies for both average and peak (or quasi-peak) detection, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

**Remark:**

According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

**TEST RESULTS: The unit does meet the FCC Part 15 C Section 15.231 requirements.**

### 5.3.2 Occupy Bandwidth

**Test Requirement:** FCC Part15 C

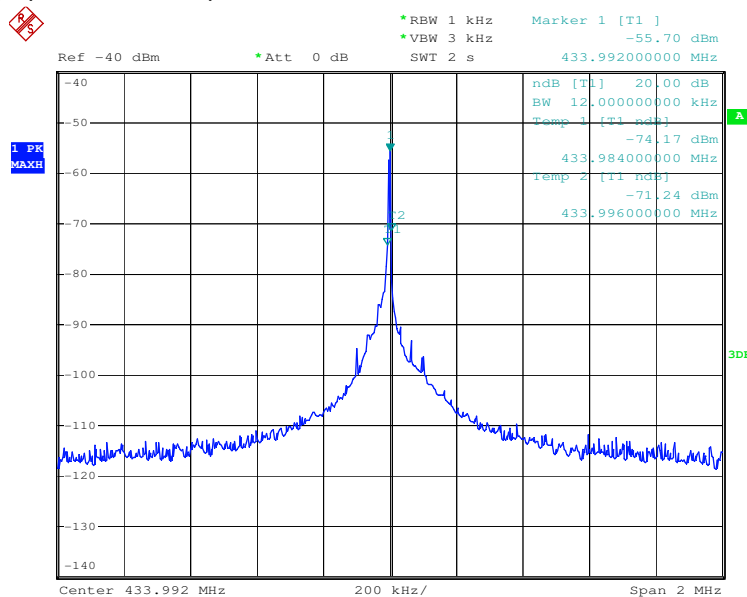
**Test Method:** ANSI C63.4 section 13 & FCC Part 2.1049

**Requirements:** 15.231 (c3) 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.

**Limit:** 15.231(c)

**Method of measurement:** A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken. The vertical is set to 10dB per division. The horizontal scale is set to 200KHz per division.

The graph as below: represents the emissions take for this device.



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**The results: The unit does meet the FCC Part 15C Section 15.231 requirements.**

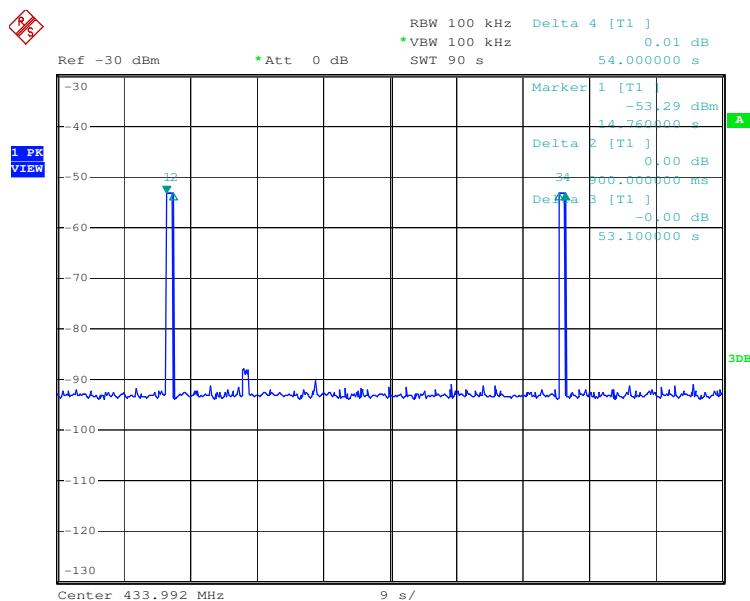
### 5.3.3 Dwell time

**Test Requirement:** FCC Part15 C

**Test Method:** FCC Part15 C Section 15.231.

**Requirements:**

**1. Regulation 15.231 (e)** In addition, devices operated under the provisions of this paragraph 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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**The results: The unit does meet the FCC Part 15C Section 15.231 requirements.**