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Development District  
Guangzhou, China 510663  
**FEDERAL COMMUNICATIONS COMMISSION**  
Registration number: 282399

Report No.: GLEMO051203064RFF(I)  
Page: 1 of 12  
FCC ID: KHK88001205

## ***FCC TEST REPORT***

**Application No.** : GLEMO051203064RF  
**Applicant** : Wai Hang Electronic Co.Ltd.  
**FCC ID** : KHK88001205  
**Fundamental Frequency** : 433.79MHz  
**Equipment under Test (EUT):**  
    Name : Projection Clock Radio (Transmitter Part)  
    Model : AV-880R/AV-880  
**Standards** : FCC PART 15, SUBPART C : 2005 (Section 15.231)  
**Date of Receipt** : 6 December 2005  
**Date of Test** : 6 to 22 December 2005  
**Date of Issue** : 27 December 2005

<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:



Jerry Chen  
Manager

This report refers to the General Conditions for Inspection and Testing Services, printed overleaf  
This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.  
This report may only be reproduced and distributed in full. 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.

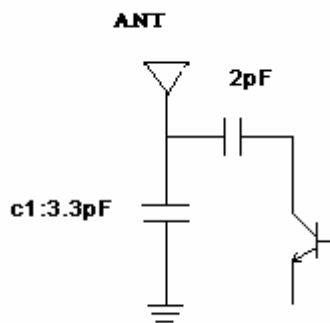
## 2 Test Summary

Test	Test Requirement	Stanadard Paragraph	Result
Radiated Emission (30MHz to 1000MHz)	FCC PART 15 :2004	Section 15.231	PASS
Occupied Bandwidth	FCC PART 15 :2004	Section 15.231	PASS
Last Time	FCC PART 15 :2004	Section 15.231	PASS

Remark:

The EUT passed Radiated Emission test after the modification as shown as the below:

1. Add a capacitor  $C_1$  for the transmitter ( $C_1$ : 3.3pF)



Please refer the section 6 of this report and circuit diagram for the detail.



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## **4 General Information**

### **4.1 Client Information**

Applicant: Wai Hang Electronic Co.Ltd.  
Address of Applicant: Rm.1807-8,New Treade Plaza,Block B,6 On Ping Street,Siu Lek Yuen,Shatin,N.T.,Hong Kong

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

Product Name: Projection Clock Radio (Transmitter Part)  
Model: AV-880R/AV-880  
Power Supply: 3.0Vdc ( 2 x 'AAA' Size Batteries).

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

The EUT was tested as an independent unit: a 433MHz radio transmitter.

### **4.4 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

### **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:

- **NVLAP – Lab Code: 200611-0**  
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0. Effective through December 31, 2005.
- **ACA**  
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.
- **VCCI**  
The 3m Semi-anechoic chamber and Shielded Room (11.5m x 4m x 4m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1599 and C-1706 respectively.  
Date of Registration: June 01, 2005. Valid until February 22, 2008
- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**  
Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.
- **CNAL – LAB Code: L0141**  
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of Testing Laboratories.
- **FCC – Registration No.: 282399**  
SGS-CSTC Standards Technical Services 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 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorised test laboratory for the DoC process.
- **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.: 5169.



## 5 Test Results

### 5.1 Test Instruments

RE in Chamber						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi- Anechoic Chamber	Frankonia	N/A	N/A	31-01-2005	30-01-2006
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	26-03-2005	25-03-2006
3	EMI Test Software	Audix	E3	N/A	N/A	N/A
4	Coaxial cable	SGS	N/A	N/A	05-12-2004	04-12-2005
5	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	17-01-2005	16-01-2006
6	Horn Antenna	Rohde & Schwarz	HF906	100095	10-05-2005	09-05-2006
7	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	29-10-2004	28-10-2005
8	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	31-06-2005	30-06-2006
9	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	26-01-2005	25-01-2006
10	Active Loop Antenna	EMCO	6502	00042963	14-01-2005	14-01-2006

### 5.2 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C

Humidity: 40 % RH

Atmospheric Pressure: 1016 mbar

EUT Operation:

Pre-test in modulation mode and keep it continuously transmitting .



### 5.3 Test Procedure & Measurement Data

#### 5.3.1 Radiated Emissions

Test Requirement: FCC Part15 C  
Test Method: ANSI C63.4  
Test Date: 12 December 2005 (initial test) , 22 December 2005 (final test)  
Measurement Distance: 3m (Semi-Anechoic Chamber)  
Frequency range 30 MHz – 5.0GHz for transmitting mode.  
Test instrumentation resolution bandwidth 120 kHz (30 MHz - 1000 MHz)  
1 MHz (1000 MHz – 25GHz)  
Receive antenna scan height 1 m - 4 m, polarization Vertical/Horizontal

Requirements:

Fundamental Frequency MHz	Field Strength of Fundamental (dB $\mu$ V/m @ 3m)	Field Strength of Harmonics and Spurious Emissions (dB $\mu$ V/m @ 3m)
40.66 to 40.70	67.04	47.04
70 to 130	61.94	41.94
130 to 174	61.94 to 71.48	41.94 to 51.48
174 to 260	71.48	51.48
260 to 470	71.48 to 81.94	51.48 to 61.94
470 and above	81.94	61.94

The fundamental frequency of the EUT is 433.79MHz

According to 15.231(e) and refer the section 5,the limit for average field strength dB $\mu$ V/m for the fundamental frequency= 72.8dB $\mu$ V/m.

No fundamental is allowed in the restricted bands.

The limit for average field strength dB $\mu$ V/m for the harmonics and spurious frequencies = 52.8dB $\mu$ V/m. Spurious in the restricted bands must be less than 54dB $\mu$ V/m or 15.209.

**Test Procedure:** The procedure used was ANSI Standard C63.4-2003. The receive was scanned from 30MHz to 5.0GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes.



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

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

An initial pre-scan was performed in the 3m chamber using the spectrum analyser 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 on 22 December 2005:

1. Fundamental emission

Test Frequency (MHz)	Peak (dBµV/m)		Limits (dBµV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
433.79	75.4	61.2	92.8	17.4	31.6

Test Frequency (MHz)	Average (dBµV/m)		Limits (dBµV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
433.79	56.7	42.6	72.8	16.1	30.2

2. Harmonics & Spurious Emissions

Test Frequency (MHz)	Peak (dBµV/m)		Limits (dBµV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
867.58	55.5	50.0	72.8	17.3	22.8
1301.37	47.5	44.3	72.8	25.3	28.5
1735.16	47.6	43.6	72.8	25.2	29.2
2168.95	39.0	38.1	72.8	33.8	34.7
2602.74	38.2	37.9	72.8	34.6	34.9
3036.53	51.9	46.3	72.8	20.9	26.5
3470.32	50.5	43.9	72.8	22.3	28.9
3904.11	40.3	38.3	72.8	32.5	34.5
4337.9	41.1	39.0	72.8	31.7	33.8





Test Frequency (MHz)	Average (dB $\mu$ V/m)		Limits (dB $\mu$ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
867.58	45.3	41.2	52.8	7.5	11.6
1301.37	35.5	30.7	52.8	17.3	22.1
1735.16	31.6	32.1	52.8	21.2	20.7
2168.95	25.6	24.4	52.8	27.2	28.4
2602.74	24.7	22.6	52.8	28.1	30.2
3036.53	38.6	34.8	52.8	14.2	18.0
3470.32	40.1	32.5	52.8	12.7	20.3
3904.11	30.0	25.6	52.8	22.8	27.2
4337.9	29.8	25.9	52.8	23.0	26.9

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.**



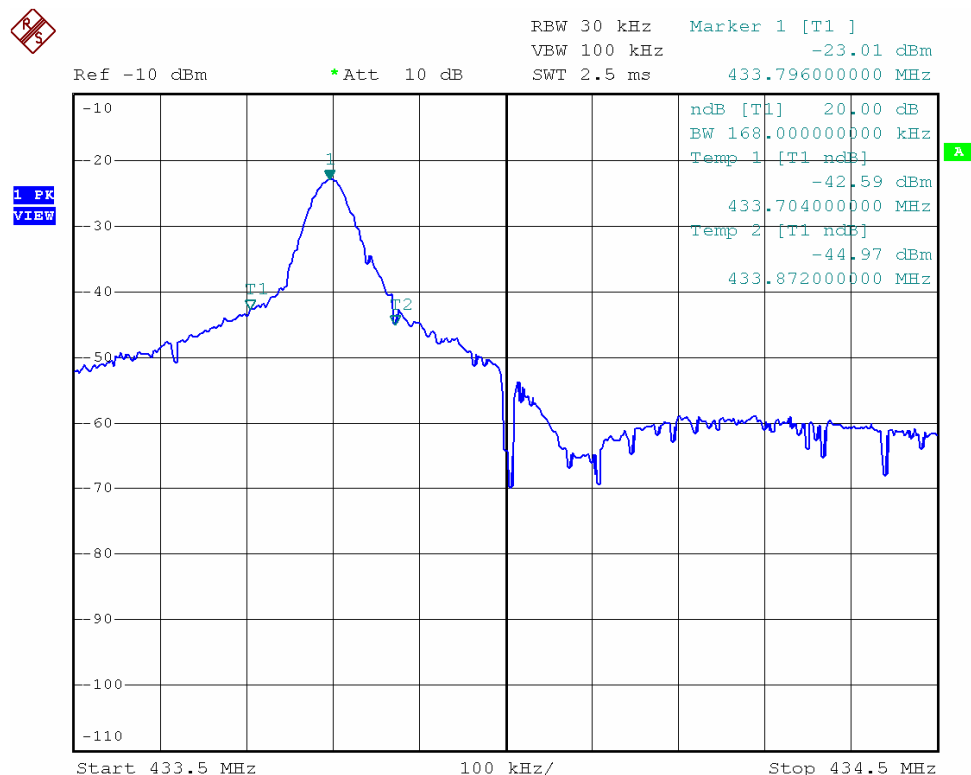
### 5.3.2 Occupied Bandwidth

Test Requirement: FCC Part15 C  
Test Method: ANSI C63.4  
Test Date: 9 December 2005

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.

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 100KHz per division.

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



Date: 9.DEC.2005 12:37:20

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



### 5.3.3 Last Time

Test Requirement: FCC Part15 C  
Test Method: FCC Part15 C Section 15.231.  
Test Date: 9 December 2005  
Requirements:

**1. Regulation 15.231 (a)** The provisions of this Section are restricted to periodic operation within the band 40.66 40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this Section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Radio control of toys is not permitted. Continuous transmissions, such as voice or video, and data transmissions are not permitted. The prohibition against data transmissions does not preclude the use of recognition codes. Those codes are used to identify the sensor that is activated or to identify the particular component as being part of the system.

**Result:**

The EUT does meet the requirements of this section. It comply with the provisions by reduced field strength limit according 15.231(e).

**2. Regulation 15.231 (a1)** A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

**Result:**

EUT does not have manually operating switch.

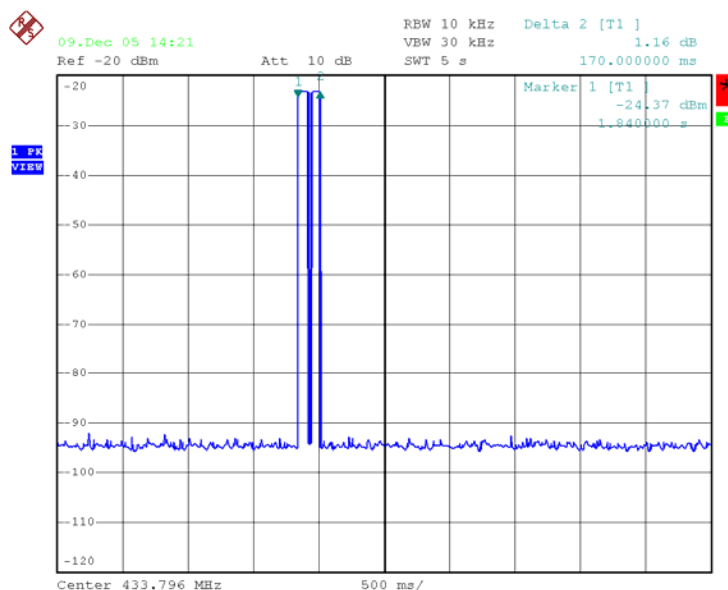
**3. Regulation 15.231 (a2)** A transmitter activated automatically shall cease transmission within 5 seconds after activation.

**Result:**

Transmitter ceases immediately after being released.

Please refer to the duration of the each tranamission as below:

The last time is nearly 170ms.





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

**4. Regulation 15.231 (a3)** Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

**Result:**

The EUT does employ periodic transmission with once transmit per 60 seconds. Once transmit last time as describe in 15.231(a2). So its total transmission time is nearly 10.6 seconds per hour. It comply with the provisions by reduced field strength limit according 15.231(e).

**5. Regulation 15.231 (a4)** Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

**Result:**

This section is not applicable to the EUT.