

Issuing Laboratory:
Intertek Testing Services Hong Kong Limited

Hong Kong Accreditation Service (HKAS) has accredited this laboratory under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.



TEST REPORT

Report No.: 13030039HKG-003

Chung's Electronic Co. Ltd.

Application
For
Certification
(Original Grant)
(FCC ID: OQH-000000-13-01)

Transmitter

Prepared and Checked by:


Wong Cheuk Ho, Herbert
Lead Engineer

Approved by:


Chan Chi Hung, Terry
Assistant Supervisor
Date: April 29, 2013

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GENERAL INFORMATION

Chung's Electronic Co. Ltd.
BRAND NAME: N/A
MODEL: C8340, C8339
FCC ID: OQH-000000-13-01

Grantee:	Chung's Electronic Co. Ltd.
Grantee Address:	Unit 1-3, 9/F, Wang Lung Ind. Bldg. 11 Lung Tak St., Tsuen Wan, N.T., Hong Kong.
Contact Person:	C. A. Chang
Tel:	852-2611 3000
Fax:	852-2611 3088
e-mail:	virginia@chungs.com
Manufacturer:	Chung's Electronic Co. Ltd.
Manufacturer Address:	Unit 1-3, 9/F, Wang Lung Ind. Bldg. 11 Lung Tak St., Tsuen Wan, N.T., Hong Kong.
Brand Name:	N/A
Model:	C8340, C8339
Type of EUT:	Transmitter
Description of EUT:	Remote Sensor
Serial Number:	N/A
FCC ID:	OQH-000000-13-01
Date of Sample Submitted:	March 01, 2013
Date of Test:	March 25, 2013 to April 20, 2013
Report No.:	13030039HKG-003
Report Date:	April 29, 2013
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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**SUMMARY OF TEST RESULT****Chung's Electronic Co. Ltd.****BRAND NAME: N/A****MODEL: C8340, C8339****FCC ID: OQH-000000-13-01**

TEST SPECIFICATION	REFERENCE	RESULTS
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(a)	Pass
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(e)	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2011 Edition

Note:

1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

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1.0 General Description

1.1 Product Description

The equipment under test (EUT) is the Remote Sensor transmitter of the Radio Controlled Projector Clock with Weather Forecast operating at 433.92MHz. The EUT is powered by 3.0VDC (2X 1.5V "AA" batteries). The EUT will transmit RF signal to the corresponding receiver and the receiver will display the humidity and temperature on the screen of receiver.

The Model: C8339 is the same as the Model: C8340 in hardware aspect. RF portion and system MCU control of both models are the same. The only difference is that Model: C8340 has LCD display while Model: C8339 does not have LCD display. Only the Model: C8340 (with LCD display) was tested.

Antenna Type : Internal, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

The Declaration of the Conformity procedure of receiver for this transmitter (with FCC ID: OQH-000000-13-01) is being processed as the same time of this application.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “Justification Section” of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC.

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2.0 System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2009).

The device was powered by 2 x new 1.5V size "AA" batteries.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

Model: C8340 contained LCD display that would have higher emission level and thus chosen for test.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it transmits the RF signal continuously.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Equipment Modification

Any modifications installed previous to testing by Chung's Electronic Co. Ltd. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services Hong Kong Ltd.

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2.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

2.6 Support Equipment List and Description

N/A.

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3.0 Emission Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG - AV$$

where FS = Field Strength in $\text{dB}\mu\text{V}/\text{m}$

RA = Receiver Amplitude (including preamplifier) in $\text{dB}\mu\text{V}$

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where FS = Field Strength in $\text{dB}\mu\text{V}/\text{m}$

RR = RA - AG - AV in $\text{dB}\mu\text{V}$

LF = CF + AF in dB

Assume a receiver reading of 52.0 $\text{dB}\mu\text{V}$ is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 $\text{dB}\mu\text{V}/\text{m}$. This value in $\text{dB}\mu\text{V}/\text{m}$ was converted to its corresponding level in $\mu\text{V}/\text{m}$.

$$RA = 52.0 \text{ dB}\mu\text{V}/\text{m}$$

$$AF = 7.4 \text{ dB}$$

$$RR = 18.0 \text{ dB}\mu\text{V}$$

$$CF = 1.6 \text{ dB}$$

$$LF = 9.0 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$AV = 5.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 18 + 9 = 27 \text{ dB}\mu\text{V}/\text{m}$$

$$\text{Level in } \mu\text{V}/\text{m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V}/\text{m})/20] = 22.4 \mu\text{V}/\text{m}$$

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 433.917 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 0.3 dB

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Applicant: Chung's Electronic Co. Ltd.

Date of Test: April 19, 2013

Model: C8340

Worst-Case Operating Mode: Transmitting (Reset)

Table 1

**Radiated Emissions
Pursuant to FCC Part 15 Section 15.231(a) Requirement**

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna factor (dB)	Average Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	433.917	70.8	16	25.0	7.2	72.6	80.8	-8.2
V	867.834	34.0	16	31.0	7.2	41.8	60.8	-19.0
V	1301.751	55.7	34	26.1	7.2	40.6	54.0	-13.4
V	1735.668	53.4	34	27.2	7.2	39.4	60.8	-21.4
V	2169.585	49.4	34	29.4	7.2	37.6	60.8	-23.2
V	2603.502	55.4	34	30.4	7.2	44.6	60.8	-16.2
H	3037.419	44.9	34	31.9	7.2	35.6	60.8	-25.2
H	3471.336	59.5	34	31.9	7.2	50.2	60.8	-10.6
V	3905.253	41.8	34	33.3	7.2	33.9	54.0	-20.1
H	4339.170	42.4	34	34.8	7.2	36.0	54.0	-18.0

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative sign in the column shows value below limit.
4. Horn antenna is used for the emission over 1000MHz.

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Applicant: Chung's Electronic Co. Ltd.

Date of Test: April 19, 2013

Model: C8340

Worst-Case Operating Mode: Transmitting

Table 2

**Radiated Emissions
Pursuant to FCC Part 15 Section 15.231(e) Requirement**

Polari-zation	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna factor (dB)	Average Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	433.917	70.8	16	25.0	7.2	72.6	72.9	-0.3
V	867.834	34.0	16	31.0	7.2	41.8	52.9	-11.1
V	1301.751	54.7	33	26.1	7.2	40.6	54.0	-13.4
V	1735.668	52.4	33	27.2	7.2	39.4	52.9	-13.5
V	2169.585	48.4	33	29.4	7.2	37.6	52.9	-15.3
V	2603.502	54.4	33	30.4	7.2	44.6	52.9	-8.3
V	3037.419	43.9	33	31.9	7.2	35.6	52.9	-17.3
V	3471.336	58.5	33	31.9	7.2	50.2	52.9	-2.7
V	3905.253	40.8	33	33.3	7.2	33.9	54.0	-20.1
H	4339.170	41.4	33	34.8	7.2	36.0	54.0	-18.0

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative sign in the column shows value below limit.
4. Horn antenna is used for the emission over 1000MHz.

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4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 Product Labelling

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

6.0 Technical Specifications

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

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8.0 Miscellaneous Information

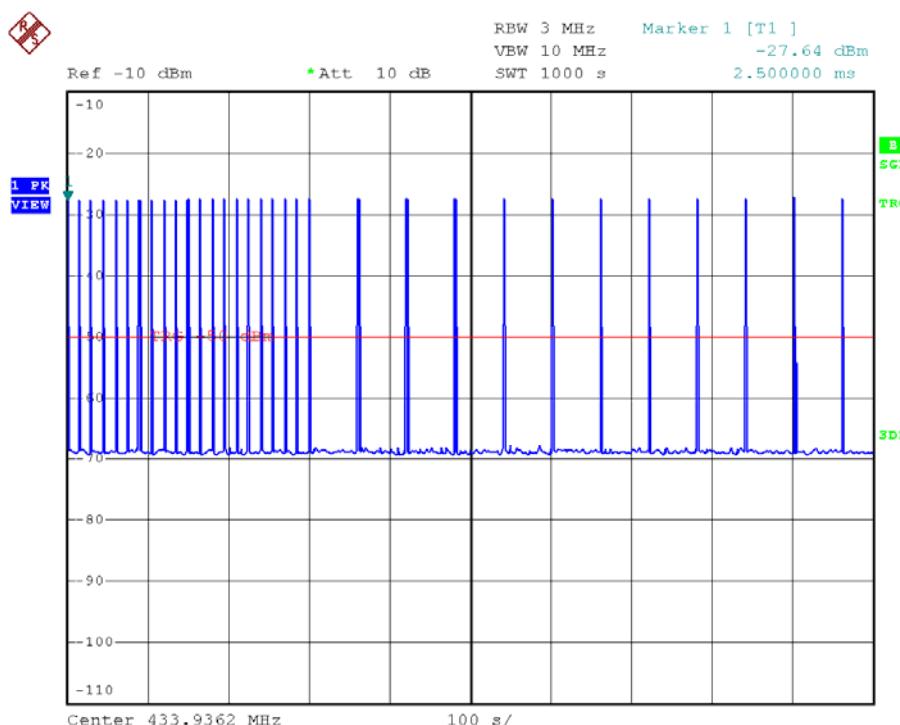
The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor (calculation and timing diagram).

Timing Plot – Pursuant to FCC Part 15 Section 15.231(e)

Result: Transmission duration = 380ms
 Minimum silent duration between transmissions = 14.2s

Comment: the silent period between transmissions was found at least 30 times the duration of the transmission and greater than 10 seconds.

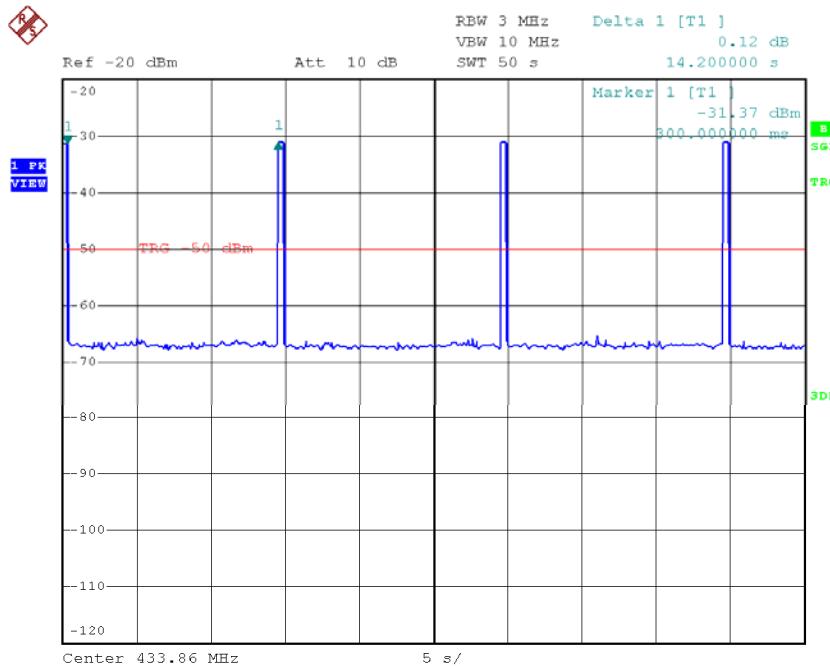
380ms X 30 < 14.2s (Pass)



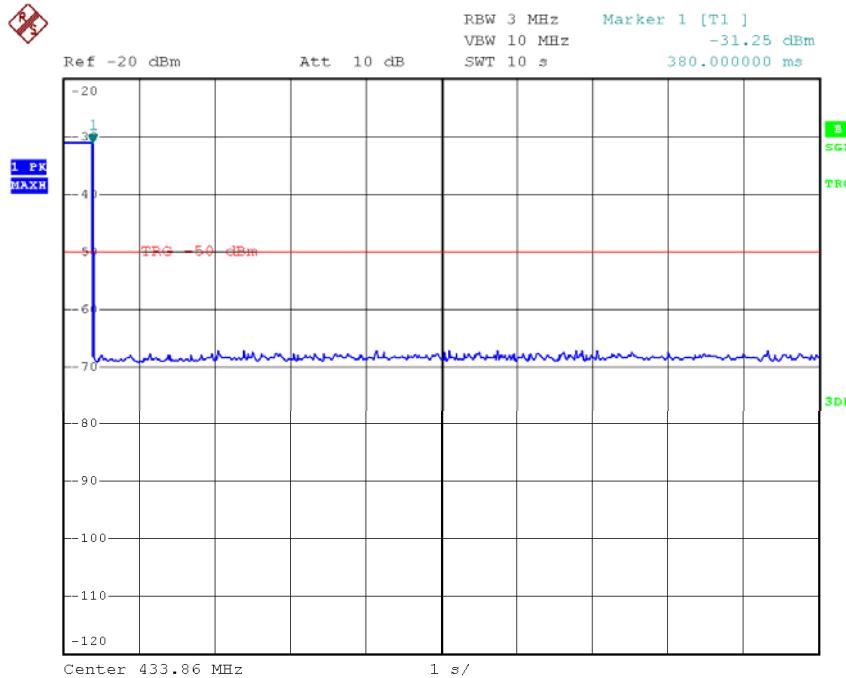
Date: 18.APR.2013 13:30:46

Issuing Laboratory:
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Date: 18.APR.2013 15:53:25



Date: 18.APR.2013 15:57:30

Report No.: 13030039HKG-003
FCC ID: OQH-000000-13-01

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Intertek Testing Services Hong Kong Ltd.

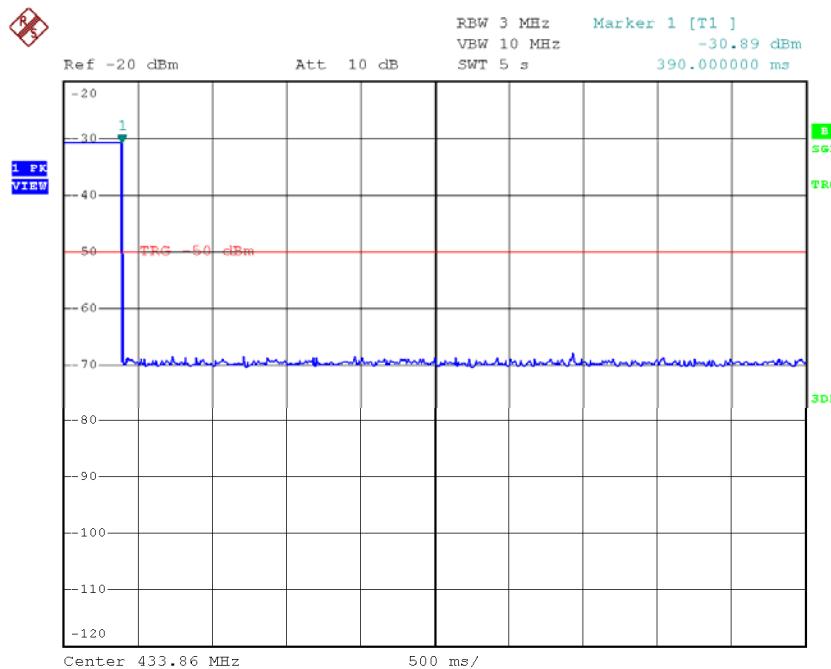
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-ettsemko.com

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Timing Plot – Pursuant to FCC Part 15 Section 15.231(a)



Date: 18.APR.2013 15:58:27

Result: The emission was found to cease within 5 seconds after reset button release.

Comment: Pass

Issuing Laboratory:

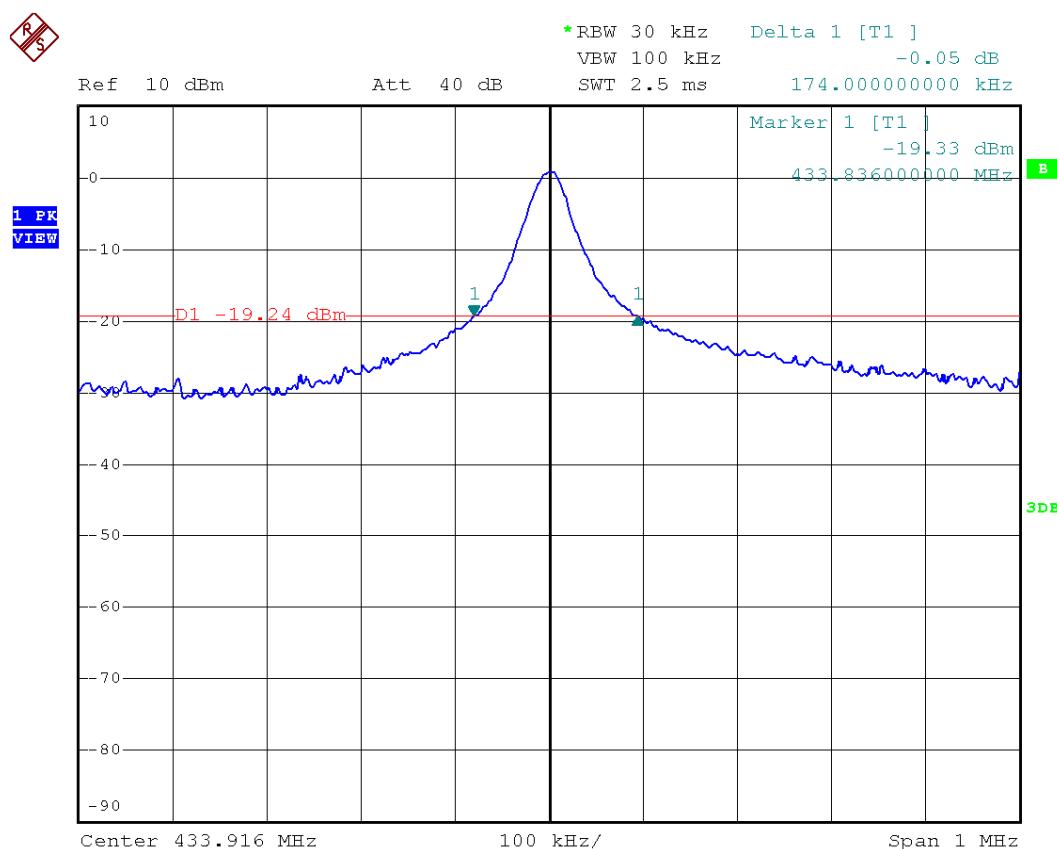
Intertek Testing Services Hong Kong Limited

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8.1 Measured Bandwidth

The plot shows the fundamental emission when modulated is saved with filename: bw.pdf. From the plot, the bandwidth is observed to be 174kHz, at 20dBc where the bandwidth limit is 1.0848Hz.



Date: 20.APR.2013 16:41:54

8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period (T_{eff}) is approximately 43.8ms for a digital "1" bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 3MHz, so the pulse desensitivity factor is 0dB.

8.3 Calculation of Average Factor

The duty cycle is simply the on-time divided by the period:

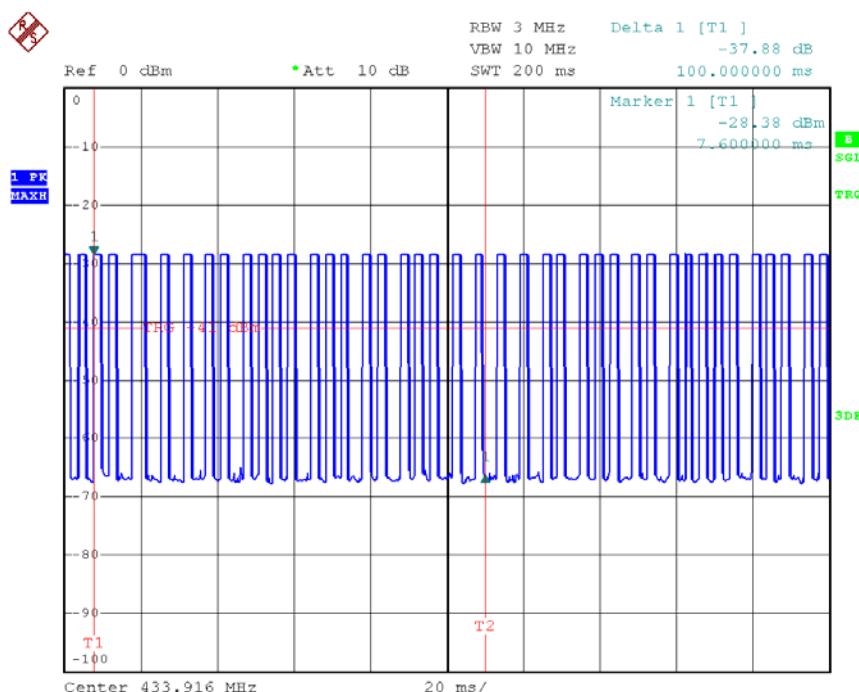
The duration of one cycle = 100ms

Effective period of the cycle = $2\text{ms} \times 20 + 3.8\text{ms} = 43.8\text{ms}$

DC = $43.8\text{ms} / 100\text{ms} = 0.438$

Therefore, the averaging factor is found by $20\log 0.438 = -7.2\text{dB}$.

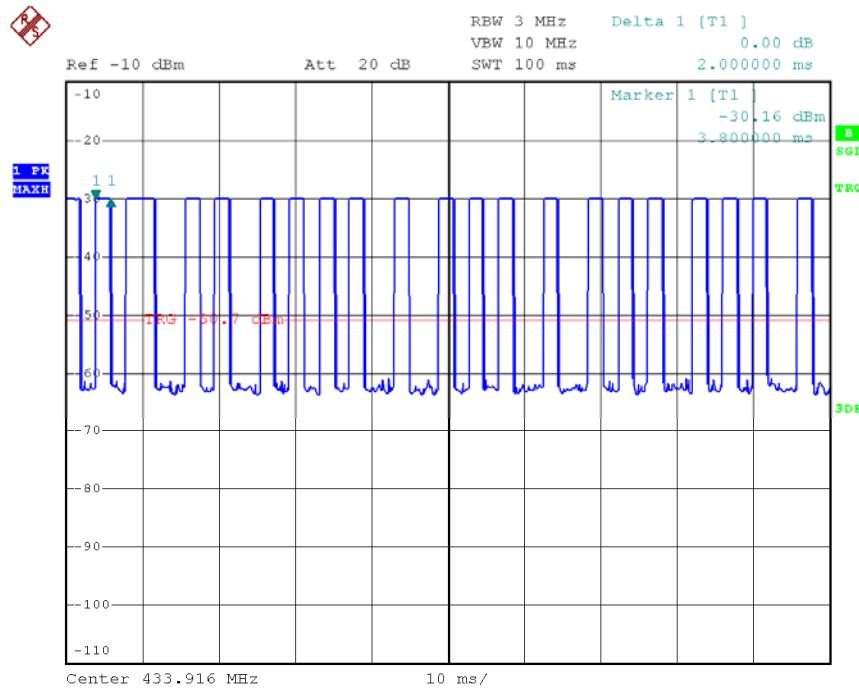
Note: Data structure of emission regarding to FCC Part 15 Section 231(a) and 231(e) were found to be the same and thus using common average factor in calculation.



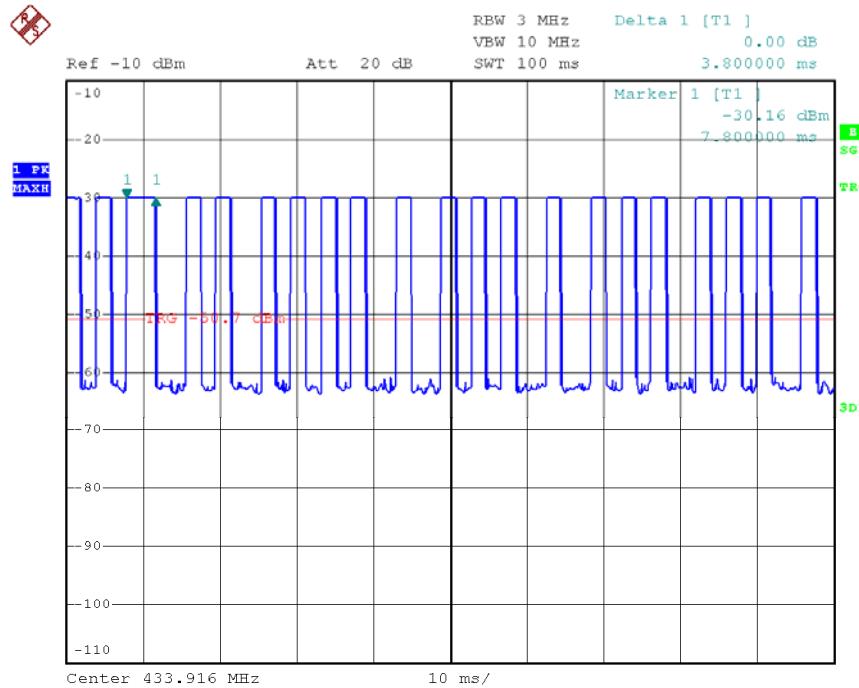
Date: 20.APR.2013 16:58:31

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Date: 25.MAR.2013 16:57:45



Date: 25.MAR.2013 16:58:10

Report No.: 13030039HKG-003
FCC ID: OQH-000000-13-01

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Intertek Testing Services Hong Kong Ltd.

2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-ettsemko.com

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8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 (2009). A typical or an unmodulated CW signal at the operating frequency of the EUT has been supplied to the EUT for all measurements. Such a signal is supplied by a signal generator and an antenna in close proximity to the EUT. The signal level is sufficient to stabilize the local oscillator of the EUT.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

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8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.4 (2009).

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

9.0 Confidentiality Request

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: request.pdf.

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10.0 Equipment List

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-2666	EW-2512	EW-0446
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI7	3104C	3146
Calibration Date	May 21, 2012	Nov. 15, 2011	Oct. 31, 2011
Calibration Due Date	May 21, 2013	May 15, 2013	Apr. 30, 2013

Equipment	Spectrum Analyzer	Double Ridged Guide Antenna
Registration No.	EW-2188	EW-1133
Manufacturer	AGILENTTECH	EMCO
Model No.	E4407B	3115
Calibration Date	Nov. 05, 2012	Oct. 05, 2012
Calibration Due Date	Nov. 05, 2013	Apr. 05, 2014

2) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2249
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Oct. 04, 2012
Calibration Due Date	Oct. 04, 2013