CMA Testing and Certification Laboratories
廠商會檢定中心

TEST REPORT

Report No.	:	AJ005666-001	Date :	2007 April 19
Application No.	:	LJ205341(4)		
Client	:	FORMATION LTD. SUITE 915-918, 9/F., CORPORATION SQUARE 8 LAM LOK STREET, KOWLOON BAY, KOWLOON, HONG KONG.		
Sample Description	:	One(1) submitted sample(s) stated to be Outdoor Sensor of Model No. TX2500 Radio Frequency : 433.920MHz Transmitter Rating : 2 x 1.5V AA size batteries No. of submitted sample : Two (2) piece(s) ***		
Date Received	:	2007 March 16		
Test Period	:	2007 March 16 – 2007 March 28		
Test Requested	:	FCC Part 15 Certification.		
Test Method	:	47 CFR Part 15 (10-1-05 Edition) ANSI C63.4 – 2003		
Test Result	:	See attached sheet(s) from page 2 to 13.		
Conclusion	:	The submitted sample was found to comply with requirement of FCC Part 15 Subpart C.		

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Danny Chui
Deputy Manager - EL. Division

FCC ID: UU7DCTX1

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1 General Information

1.1 General Description

The equipment under test (EUT) is a transmitter. It operates at 433.920MHz and the oscillation of radio control is generated by a crystal. The EUT is power by 2 x 1.5V AA size batteries. There are single switch inside the battery cover for select different channel (CH1, CH2 and CH3), and the LCD display will show the temperature states. All data will transmit to receiver through radio frequency. The difference in between CH1 – CH3 is modulation code signal.

The brief circuit description is listed as follows:
- U1 and its associated circuit act as a Microcontroller.
- X1 and its associated circuit act as an oscillator for U1.
- Q2, X2 and its associated circuit act as an oscillator for radio transmission.
- Q3 and its associated circuit act as a RF amplifier.

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1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. A shielded room is located at :

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9 – 13 Wong Chuk Yeung Street,
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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.
EMI Test Receiver	R&S	ESCI	100152
Spectrum Analyzer	R&S	FSP30	100628
Broadband Antenna	Schaffner	CBL6112B	2692
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531
Broadband pre-amplify	Schwarzbeck	BBV9718	9718-119

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2 Description of the radiated emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

2.2 Test Result

Peak Detector data was measured unless otherwise stated.

"#" means emissions appearing within the restricted bands shall follow the requirement of section 15.205.

It was found that the EUT meet the FCC requirement.

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2.3 Radiated Emission Measurement Data

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Frequency Channel: CH1

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV/m)	Antenna and Cable factor (dB)	Average Factor (dB)	Field Strength (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
433.855	H	39.1	17.9	-25.8	31.2	72.8	-41.6
867.711	H	13.3	22.7	-25.8	10.2	52.8	-42.6
1301.326	H	7.0	28.2	-25.8	9.4	54.0	-44.6
1735.178	H	3.3	30.6	-25.8	8.1	54.0	-45.9
2169.290	H	34.5	0.5	-25.8	9.2	54.0	-44.8
2603.151	H	37.0	1.1	-25.8	12.3	54.0	-41.7
3037.008	H	31.6	1.5	-25.8	7.3	54.0	-46.7
3470.849	H	28.6	1.3	-25.8	4.1	54.0	-49.9
3904.705	H	28.3	4.0	-25.8	6.5	54.0	-47.5
#4338.600	H	28.3	5.4	-25.8	7.9	54.0	-46.1

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Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Frequency Channel: CH2

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV/m)	Antenna and Cable factor (dB)	Average Factor (dB)	Field Strength (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
433.855	H	39.9	17.9	-25.8	32.0	72.8	-40.8
867.711	H	13.0	22.7	-25.8	9.9	52.8	-42.9
1301.326	H	7.6	28.2	-25.8	10.0	54.0	-44.0
1735.178	H	3.4	30.6	-25.8	8.2	54.0	-45.8
2169.290	H	34.5	0.5	-25.8	9.2	54.0	-44.8
2603.151	H	37.9	1.1	-25.8	13.2	54.0	-40.8
3037.008	H	32.1	1.5	-25.8	7.8	54.0	-46.2
3470.849	H	29.0	1.3	-25.8	4.5	54.0	-49.5
3904.705	H	28.0	4.0	-25.8	6.2	54.0	-47.8
#4338.600	H	28.7	5.4	-25.8	8.3	54.0	-45.7

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Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Frequency Channel: CH3

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV/m)	Antenna and Cable factor (dB)	Average Factor (dB)	Field Strength (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
433.855	H	39.1	17.9	-25.8	31.2	72.8	-41.6
867.711	H	12.8	22.7	-25.8	9.7	52.8	-43.1
1301.326	H	7.0	28.2	-25.8	9.4	54.0	-44.6
1735.178	H	4.2	30.6	-25.8	9.0	54.0	-45.0
2169.290	H	34.8	0.5	-25.8	9.5	54.0	-44.5
2603.151	H	37.3	1.1	-25.8	12.6	54.0	-41.4
3037.008	H	32.6	1.5	-25.8	8.3	54.0	-45.7
3470.849	H	29.9	1.3	-25.8	5.4	54.0	-48.6
3904.705	H	29.0	4.0	-25.8	7.2	54.0	-46.8
#4338.600	H	27.9	5.4	-25.8	7.5	54.0	-46.5

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3 Description of the Line-conducted Test

3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

No measurement is required as the EUT is a battery-operated product.

3.3 Graph and Table of Conducted Emission Measurement Data

Not Applicable

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4 Photograph

4.1 Photographs of the Test Setup for Radiated Emission and Conduction Emission

For electronic filing, the photos are saved with filename TSup1.jpg to TSup2.jpg

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename ExPho1.jpg to ExPho2.jpg and InPho1.jpg to InPho2.jpg.

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5 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

Document	Filename
ID Label/Location	LabelSmp.jpg
Block Diagram	BlkDia.pdf
Schematic Diagram	Schem.pdf
Users Manual	UserMan.pdf
Operational Description	OpDes.pdf

5.1 Bandwidth

The plot on saved in TestRpt2.pdf shows the fundamental emission is confined in the specified band. The bandwidth requirement is 0.25% x 433.855 = 1.085MHz.

5.2 Duty cycle

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

The duration of one cycle = 100 ms

Effective period of the cycle = (0.19 x 27) ms

Duty Cycle = (5.13/100) ms
= 0.051

Therefore, the average factor is found by $\underline{20 \log_{10}} 0.051 = -25.8$dB

5.3 Transmission period

Duration of each transmission = 34.7 seconds

The duration of each transmission is 0.96 seconds, and required silent period is at lease 10 seconds or 30 times the duration of transmission according to section 15.231(e). The plot on saved in Test Rpt4.pdf shows the EUT meets the relevant has an at least 30 second silent period and thus met the FCC requirements.

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A3.	Photos of Internal Configurations	2	pages
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A5.	Bandwidth Plot	1	page
A6.	Average Factor	2	pages
A7.	Transmission Period	1	page
A8.	Block Diagram	1	page
A9.	Schematics Diagram	1	page
A10.	User Manual	6	pages
A11.	Operation Description	1	page

***** End of Report *****

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