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Dae Myung Electronics

Dates of Tests: November 1 ~ 2, 2005  
Test Report S/N: LR500110511A  
Test Site : LTA CO., LTD.

FCC ID

**TRKHC108T**

## APPLICANT

DAE MYUNG ELECTRONICS CO.,LTD

# TEST REPORT

## FCC Part 15C Certification

This test report is issued under the authority of:

The test was supervised by:

~~107.~~

W. J.

Dong -Min JUNG, Technical Manager

Kyung-Taek LEE, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by NVLAP or any agency of the U.S. Government.

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## 1. General information's

### **1-1 Test Performed**

Company name : LTA Co., Ltd.  
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822  
 Web site : <http://www.ltalab.com>  
 E-mail : [chahn@ltalab.com](mailto:chahn@ltalab.com)  
 Telephone : +82-31-323-6008  
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

### **1-2 Accredited agencies**

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	After Assessment	ECT accredited Lab.
RRL	KOREA	KR0049	2007-07-13	EMC accredited Lab.
FCC	U.S.A	610755	2008-03-28	FCC filing
VCCI	JAPAN	R2133, C2307	2008-06-22	VCCI registration
IC	CANADA	IC5799	2008-04-23	IC filing

## 2. Information's about test item

### 2-1 Client

Company name : DAE MYUNG ELECTRONICS CO.,LTD.  
 Address : 29-1, SongPa-Dong, Song Pa-Ku, Seoul 138-170  
 Country : Korea  
 Telephone : +82-2-419-7576  
 Facsimile : +82-2-418-5190

### 2-2 Equipment Under Test (EUT)

Class : B (residential environment)  
 Trade name : Happy Call (Transmitter)  
 Model name : HC-108T  
 Serial number : Identification  
 Date of receipt : October 31, 2005  
 EUT condition : Pre-production, not damaged  
 Antenna type : Pattern antenna  
 Frequency Range : 433.92 MHz  
 Number of channels : 1  
 Channel spacing : Not concerned  
 Type of Modulation : Amplitude(pulsed modulated device)  
 Power Source : DC 12V(alkaline battery)

Power level, frequency range and channels characteristics are not user adjustable.

### 2-3 Tested frequency

Frequency	TX	RX
Low	-	-
Mid	433.92 MHz	-
High	-	-

Note: Measurements were performed top and bottom location in the frequency range of operation according to the section 15.31(m)

### 2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
The EUT itself forms a system.			
No support equipment is required for its normal operation.			

### 3. Test Report

#### 3.1 Summary of tests

Parameter	Test procedure	Status
<b>Transmitter Requirements</b>		
Antenna Requirement	FCC Part 15.203	C <sup>2)</sup>
Conducted Emission	FCC Part 15.107	NA <sup>3)</sup>
Restricted Bands of Operation	FCC Part 15.205 / 209	C
Operation mode	FCC Part 15.231 a)	C <sup>4)</sup>
Radiated emissions	FCC Part 15.231 b)	C
Bandwidth of the emission	FCC Part 15.231 c)	C
<b>Receiver Requirements</b>		
Radiated Emission	FCC Part 15.109	C
Conducted Emission	FCC Part 15.107	NA <sup>2)</sup>

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: PCB Pattern antenna without connector

Note 3: Operated by battery.

Note 4: The fundamental frequency of transmitter emitted is due to a press on button of the EUT.

The emitting time of fundamental frequency is less than 5seconds.

Note 5: The data in this test report are traceable to the national or international standards.

#### A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

## 3.2 Transmitter requirements

### 3.2.1 Conducted Emission

#### Definition:

The test assesses the ability of the EUT to limit its internal noise from being present on the AC mains Power In/Output ports.

Equipment under test	: <b>HC-108T</b>
Test method	: FCC Part 15.207
Measurement Frequency range	: 150 kHz ~ 30MHz
Measurement RBW	: 10 kHz
Test mode	: -
Result	: <b>Not applicable</b>

#### Measurement Data:

- The EUT operates solely by the battery.
- According to the rule of section 15.207(c), The EUT exempt to the power line conducted test.

#### LIMIT:

Frequency Range	Near-peak	Average
0.15 ~ 0.5 MHz	66 ~ 56 dBuV	56 ~ 46 dBuV
0.5 ~ 5 MHz	56 dBuV	46 dBuV
5 ~ 30 MHz	60 dBuV	50 dBuV

Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz

TEST EQUIPMENT USED: 03,06,07,11,17

### 3.2.2 Radiated Emission

#### Definition:

The field strength of emissions from intentional radiators was measured.

Equipment under test	: <b>HC-108T</b>
Test method	: FCC Part 15.205 / 209
Transmit Frequency	: 433.92MHz
Frequency Range	: 30 MHz ~ 10 <sup>th</sup> harmonic.
Bandwidth	: 120 kHz (F < 1GHz) 1 MHz (F > 1GHz)
Distance of antenna	: 3 meters
Test mode	: Tx mode
Result	: <b>Complies</b>

#### Measurement Data:

- No other emissions were detected at a level greater than 20dB below limit.
- Refer to the next page.

#### Field Strength Limit of fundamental and Harmonics: Part 15.231(b)

Frequency (MHz)	Limit @ 3m
433.92	$41.6667(F) - 7083.3333 = 10997 \text{ uV/m} = 80.8 \text{ dBuV/m}$
Harmonics	60.8 dBuV/m (The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.)

#### Part 15.209 LIMIT:

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100**
88 ~ 216	150**
216 ~ 960	200**
Above 960	500

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

TEST EQUIPMENT USED: 01,05,08,09,10,12,13,14,15,16,18,22,24,25

Measurement Data: Tested date: 2005-11-01 Temp.: 12°C Humidity: 44 %

Frequency (MHz)	Detector	Antenna Height (cm)	Polarization of antenna	Field Strength (dBuV/m)	Limits (dBuV/m)
433.92	Average	100	H	74.6	80.8
867.84	Average	100	V	57.8	60.8
*1301.76	Peak	131	H	49.8	54.0
1735.68	Peak	135	H	42.9	60.8
-	-	-	-	-	-

\*restricted band of operation §15.205

**Note 1:** No other emission were detected at a level greater than 20 dB below limit.

**Note 2: pulsed modulated device**

A duty cycle correction factor has been applied to measures above 1 GHz.

We used the formulas:

$$\text{ON TIME} = N_1 L_1 + N_2 L_2 + \dots + N_{n-1} L_{n-1} + N_n L_n$$

(where  $N_1$  is number of type 1 pulse,  $L_1$  is length of type 1 pulse)

And DUTY CYCLE = ON TIME / 100ms or T (whichever is less, where T is the period of the pulse train).

We have found (See appendix 2),

$$N_1 = 9 \quad L_1 = 1.1\text{ms} \quad N_2 = 16 \quad L_2 = 350\text{ us} \quad T = 37.75\text{ ms}$$

So, DUTY CYCLE =  $\{(9 \times 1.1\text{ms}) + (16 \times 305\text{us})\} / 37.8\text{ms} = 39.1\%$  which gives a correction factor of

Duty cycle Correction Factor (dB) =  $10 \log (0.391) = -4.08\text{ dB}$

**Note 3:** All readings above 1GHz were taken using a peak detector function at a distance of 3 meters and the duty cycle correction factor in order to determinate the average value of the emission.

### 3.3 Receiver requirements

#### 3.3.1 Conducted Emission

##### Definition:

The test assesses the ability of the EUT to limit its internal noise from being present on the AC mains Power In/Output ports.

Equipment under test	: <b>HC-108T</b>
Test method	: FCC Part 15.107
Measurement Frequency range	: 150 kHz ~ 30MHz
Measurement RBW	: 10 kHz
Test mode	: -
Result	: <b>Not applicable</b>

##### Measurement Data:

- The EUT operates solely by the battery.

##### LIMIT:

Frequency Range	Near-peak	Average
0.15 ~ 0.5 MHz	66 ~ 56 dBuV	56 ~ 46 dBuV
0.5 ~ 5 MHz	56 dBuV	46 dBuV
5 ~ 30 MHz	60 dBuV	50 dBuV

Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz

TEST EQUIPMENT USED: 03,06,07,11,17

### 3.3.2 Radiated Emission

#### Definition:

The test assesses the ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.

Equipment under test	: <b>HC-108T</b>
Test method	: FCC Part 15.109
Frequency Range	: 30 MHz ~ 10 <sup>th</sup> harmonic.
Bandwidth	: 120 kHz (F < 1GHz) 1 MHz (F > 1GHz)
Distance of antenna	: 3 meters
Test mode	: Stand-by mode
Result	: <b>Complies</b>

**Measurement Data:**   **Tested date:** 2005-11-01      **Temp.:** 12°C      **Humidity:** 44 %

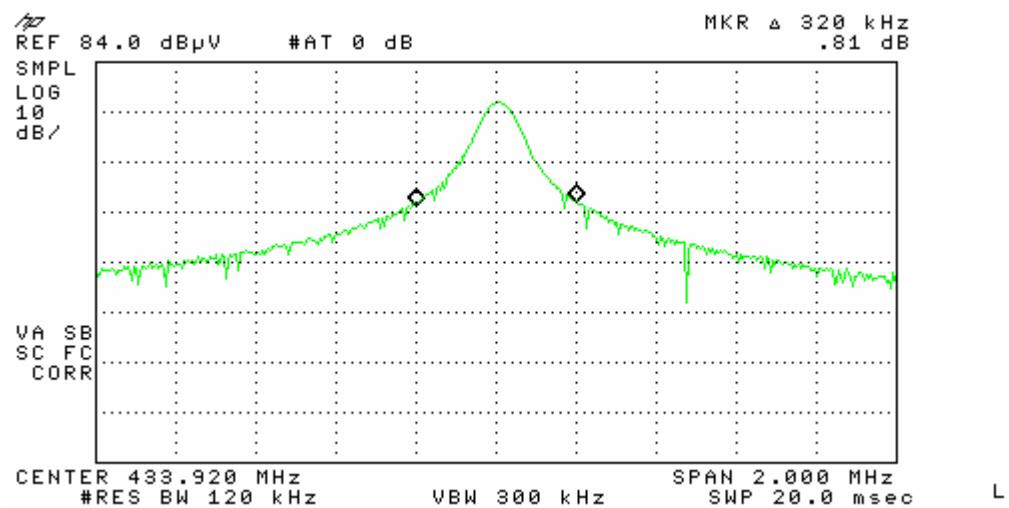
- No other emissions were detected at a level greater than 20dB below limit.

#### LIMIT:

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100
88 ~ 216	150
216 ~ 960	200
Above 960	500

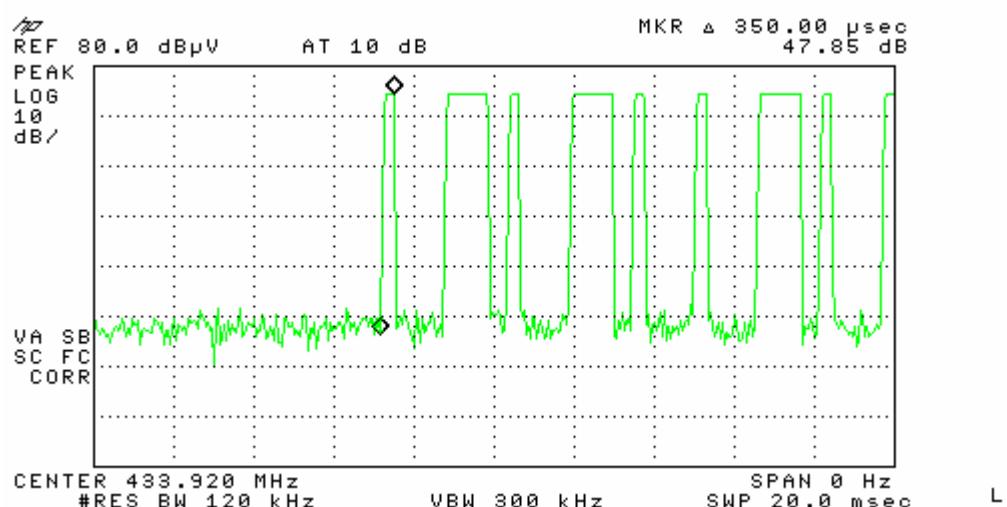
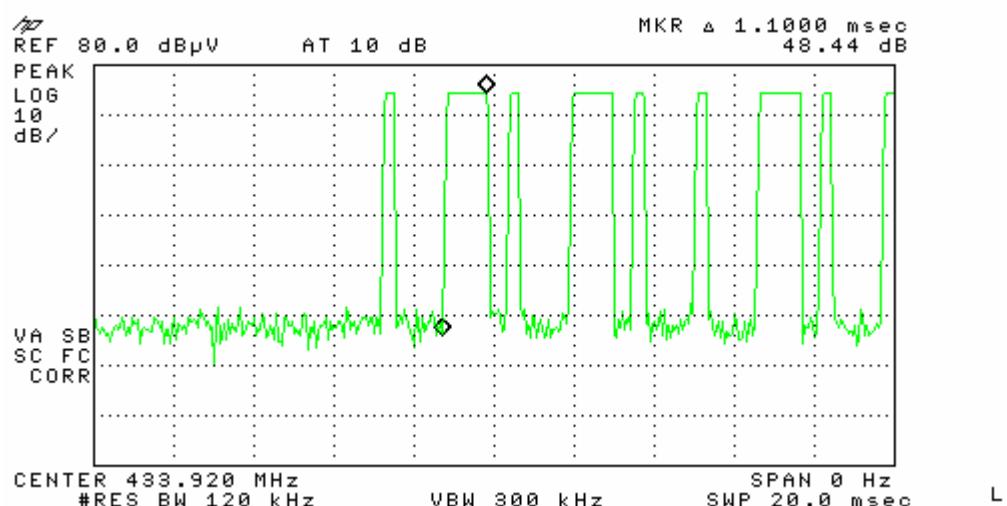
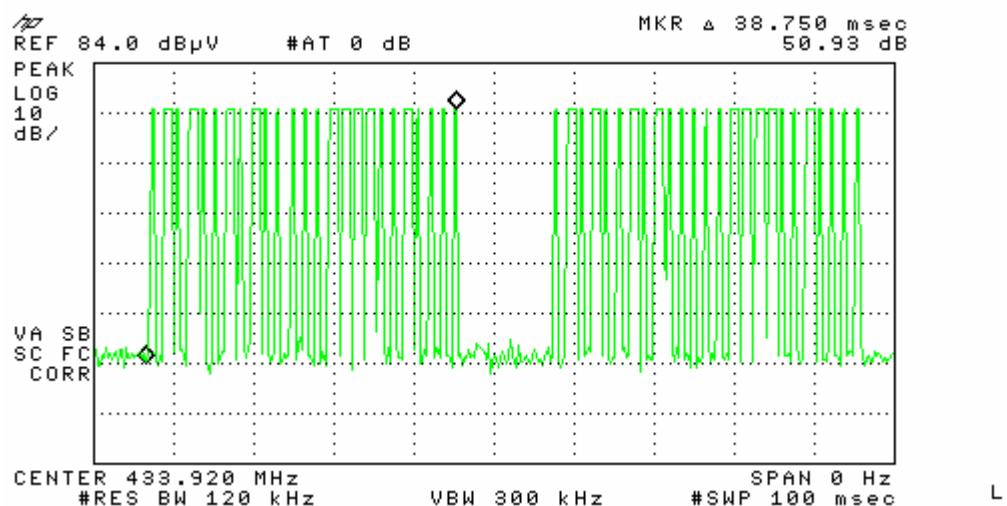
TEST EQUIPMENT USED: 01,05,08,09,10,12,13,14,15,16,18,22,24,25

**APPENDIX 1**  
**BANDWIDTH OF EMISSION**



## APPENDIX 2

### DUTY CYCLE DETERMINATION



## APPENDIX 3

### TEST EQUIPMENT USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment are identified by the Test Laboratory.

	<b>Description</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Manufacturer</b>	<b>Cal. Date</b>
1	Spectrum Analyzer	8594E	3649A03649	HP	Dec-05
2	Signal Generater	8657A	3430U02049	HP	Dec-05
3	Attenuator (3dB)	8491A	37822	HP	Dec-05
4	Attenuator (3dB)	8491A	28881	HP	Dec-05
5	EMI Test Receiver	ESVD	843748/001	R&S	Dec-05
6	LISN	KNW-407	8-1430-1	Kyoritsu	Dec-05
7	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Jan-06
8	RF Amplifier	8447D	2949A02670	HP	Jan-06
9	RF Amplifier	8447D	2439A09058	HP	Jan-06
10	RF Amplifier	8449B	3008A02126	HP	Jun-07
11	Test Receiver	ESH3	894718/017	R&S	Jan-06
12	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	Feb-06
13	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Feb-06
14	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Feb-06
15	Horn Antenna	3115	00055005	ETS LINDGREN	Jun-07
16	Horn Antenna	BBHA 9120D	0499	Schwarzbeck	Jun-07
17	Spectrum Analyzer	8591E	3649A05888	HP	Feb-06
18	Spectrum Analyzer	R3272	82420423	ADVANTEST	Feb-06
19	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Feb-06
20	Splitter (BNC)	ZFM-150	15542	Mini-Circuits	Jun-06
21	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	Jun-06
22	RF Switch	MP59B	6200414971	ANRITSU	Jun-06
23	RF Switch	MP59B	6200438565	ANRITSU	Jun-06
24	Controller	CO 2000	CO2000174/8981104/L	Inn-Co	-
25	Controller	L05021	L05021/003	DAE IL ENG	-
26	Power Divider	11636A	6243	HP	Apr-06
27	DC Power Supply	6622A	3448A03079	HP	Apr-06
28	Attenuator (30dB)	11636A	6243	HP	Apr-06
29	Attenuator (10dB)	8491A	63196	HP	Apr-06
30	Power Meter	EPM-441A	GB32481702	HP	Apr-06
31	Power Sensor	8481A	2702A64048	HP	Apr-06
32	Audio Analyzer	8903B	3729A18901	HP	May-06
33	Modulation Analyzer	8901B	3749A05878	HP	May-06
34	TEMP & HUMIDITY Chamber	YJ-500	L05022	JinYoung Tech	-

## APPENDIX 4

### **Label and User's Manual Information**

## Certification Labeling Requirements

### **§ 15.19 Labeling requirements.**

(a) In addition to the requirements in part 2 of this chapter, a device subject to **certification, or verification** shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under part 73 of this chapter, land mobile operation under part 90, etc., shall bear the following statement in a conspicuous location on the device:

*This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.*

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

*This device is verified to comply with part 15 of the FCC Rules for use with cable television service.*

(3) All other devices shall bear the following statement in a conspicuous location on the device:

*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

## **User's Manual Information**

### **§ 15.21 Information to user.**

*The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B - Unintentional Radiators:

### **§ 15.105 Information to the user.**

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

*Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.