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ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CERTIFICATION

Test report file number : E024R-040

Applicant : ENTERTECH., LTD.
Address : 401-5, Hwagok-Dong, Kangseo-Gu, Seoul, 157-887, Korea

Manufacturer : ENTERTECH., LTD.
Address : 401-5, Hwagok-Dong, Kangseo-Gu, Seoul, 157-887, Korea

Type of Equipment : PERSONAL KARAOKE (Low Power Communication Device Transmitter)

FCC ID. : PBNHARMONY

Model / Type No. : ANY SING

Multiple Model/ Type No. : N/A

Serial number : N/A

Total page of Report : 20 pages (including this page)

Date of Incoming : December 07, 2001

Date of issuing : April 16, 2002

SUMMARY

The equipment complies with the regulation; **FCC PART 15.239 SUBPART C.**

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by: G. W. Lee
G. W. Lee/ Assistant Chief Engineer

Reviewed by: Y. K. Kwon
Y. K. Kwon/ Chief Engineer

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FCC-003 (Rev.0)

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ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

- APPLICANT : ENTERTECH., LTD.
 - ADDRESS : 401-5, Hwagok-Dong, Kangseo-Gu, Seoul, 157-887, Korea
 - CONTACT PERSON : Mr. Seung-Youn, Shin / Japan Branch Director, Export Div.
 - TELEPHONE NO : +82-2-2605-0884
 - FCC ID : PBNHARMONY
 - MODEL NO/NAME : ANY SING
 - SERIAL NUMBER : N/A
 - DATE : April 16, 2002

DEVICE TYPE	Low Power Communication Device Transmitter-Intentional Radiator
E.U.T. DESCRIPTION	PERSONAL KARAOKE
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	Charter 13 of ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15.239 SUPART C
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The ENTERTECH., LTD., Model ANY SING (referred to as the EUT in this report) is a PERSONAL KARAOKE that can transmit 106.3MHz, 106.7MHz, 107.1MHz and 107.5MHz for audio signal of FM radio receiver. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	24.000 MHz, 21.47727 MHz, 9.600 MHz
POWER REQUIREMENT	DC 8V from AC/DC adapter or battery
TRANSMITTING FREQUENCY	106.3MHz, 106.7MHz, 107.1MHz and 107.5MHz
EXTERNAL TERMINALS	6 hole DIN type, Headphone

Model Differences:

The difference(s) compared to the EUT is as follows: none

2.2 Related Submittal(s) / Grant(s)

Original submittal only

2.3 Test System Details

The model numbers for all the equipments which were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
ANY SING	ENTERTECH., LTD.	PBNHARMONY	PERSONAL KARAOKE(EUT)	-
DR-09500U	DREAM ELECTRONIC CO., LTD.	N/A	AC/DC ADAPTER	EUT
SH-627	SAMICK	N/A	HEADPHONE	EUT
CTV-1010XK	KEC	N/A	TV	EUT

2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in chapter 13 of ANSI C63.4/1992.

Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

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2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)

3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	ENTERTECH., LTD.	ENTER ET-2000	N/A
KEY MATRIX BOARD	ENTERTECH., LTD.	N/A	N/A
FM TX BOARD	ENTERTECH., LTD.	MAGIC-FM	N/A

3.2 EUT exercise Software

The EUT continuously transmitted set RF signal for the purpose of the measurements.

3.3 Cable Description

Product Name	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
PERSONAL KARAOKE(EUT)	N	N	1.2(P), 5.0(D)
TV	N	N	1.2(P), 5.0(D)
HEADPHONE	N/A	N	2.5(D)

* The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

3.4 Noise Suppression Parts on Cable

Product Name	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
PERSONAL KARAOKE(EUT)	N	N/A	Y	BOTH END EUT END
TV	N	N/A	Y	BOTH END
HEADPHONE	N	N/A	Y	EUT END

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3.5 Equipment Modifications

To achieve compliance to FCC part 15 rules, the following change(s) was made by ONETECH Corp. during compliance testing:

“There was no Modified items during EMI test”

3.6 Configuration of Test System

Line Conducted Test: EUT was connected to the AC/DC adapter and this adapter was connected to LISN, all supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

Occupied Bandwidth Measurement:

This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer. The plot is taken at 50kHz/division frequency span, 10kHz resolution bandwidth and 5dB/division logarithmic display from an 8568B spectrum analyzer.

3.7 Antenna Requirement

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The FM transmitter antenna of the EUT is built-in the EUT, no consideration of replacement by the user.

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4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Standby Mode	
TX mode	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Standby Mode	
TX mode	X

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5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Conducted Emission Test

Humidity Level : 48 % Temperature : 19 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C
 Type of Test : Low Power Communication Device Transmitter
 Result : PASSED BY – 8.20 dB at 0.49 MHz

EUT : PERSONAL KARAOKE Date: April 15, 2002
 Operating Condition : FM TX MODE
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

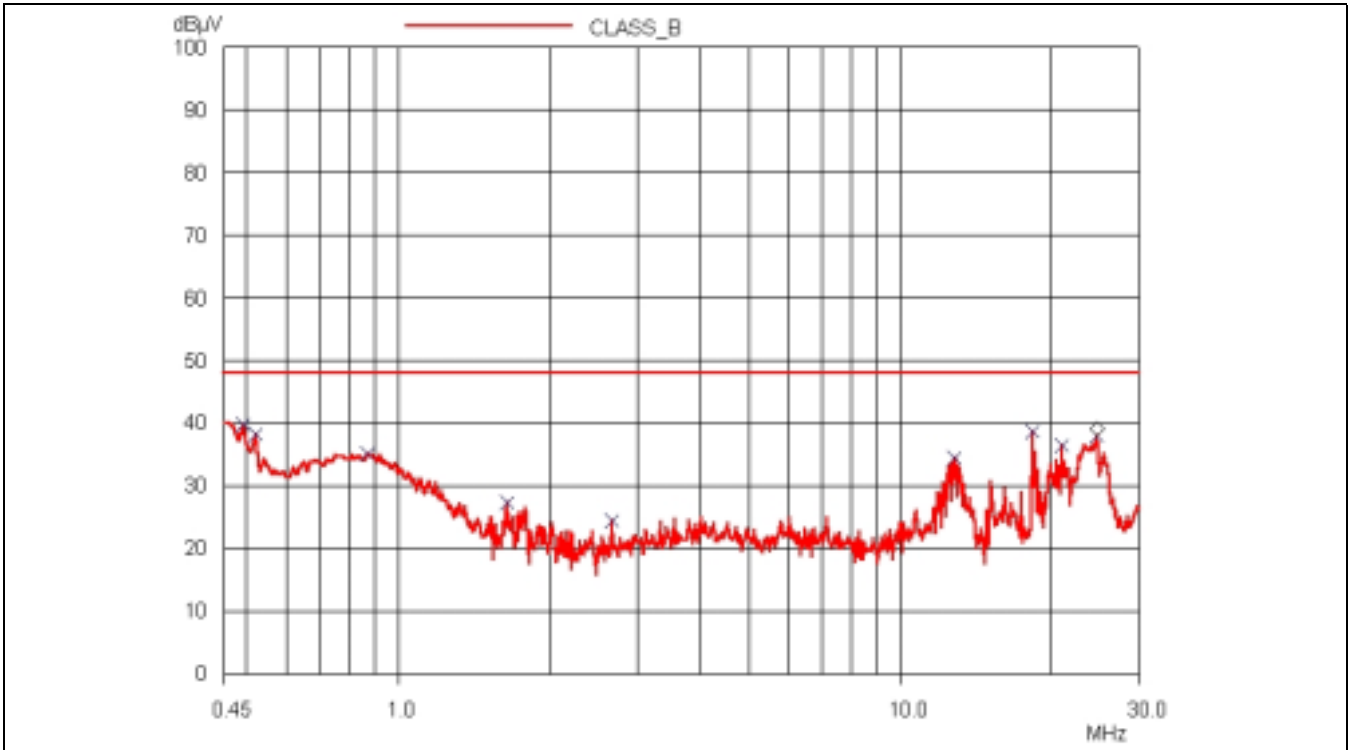
Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.49	39.80	HOT	48.00	-8.20
0.52	38.16	HOT	48.00	-9.84
0.87	35.07	HOT	48.00	-12.93
18.39	38.65	HOT	48.00	-9.35
20.96	36.43	HOT	48.00	-11.57
24.59	37.96	HOT	48.00	-10.04

Line Conducted Emission Tabulated Data

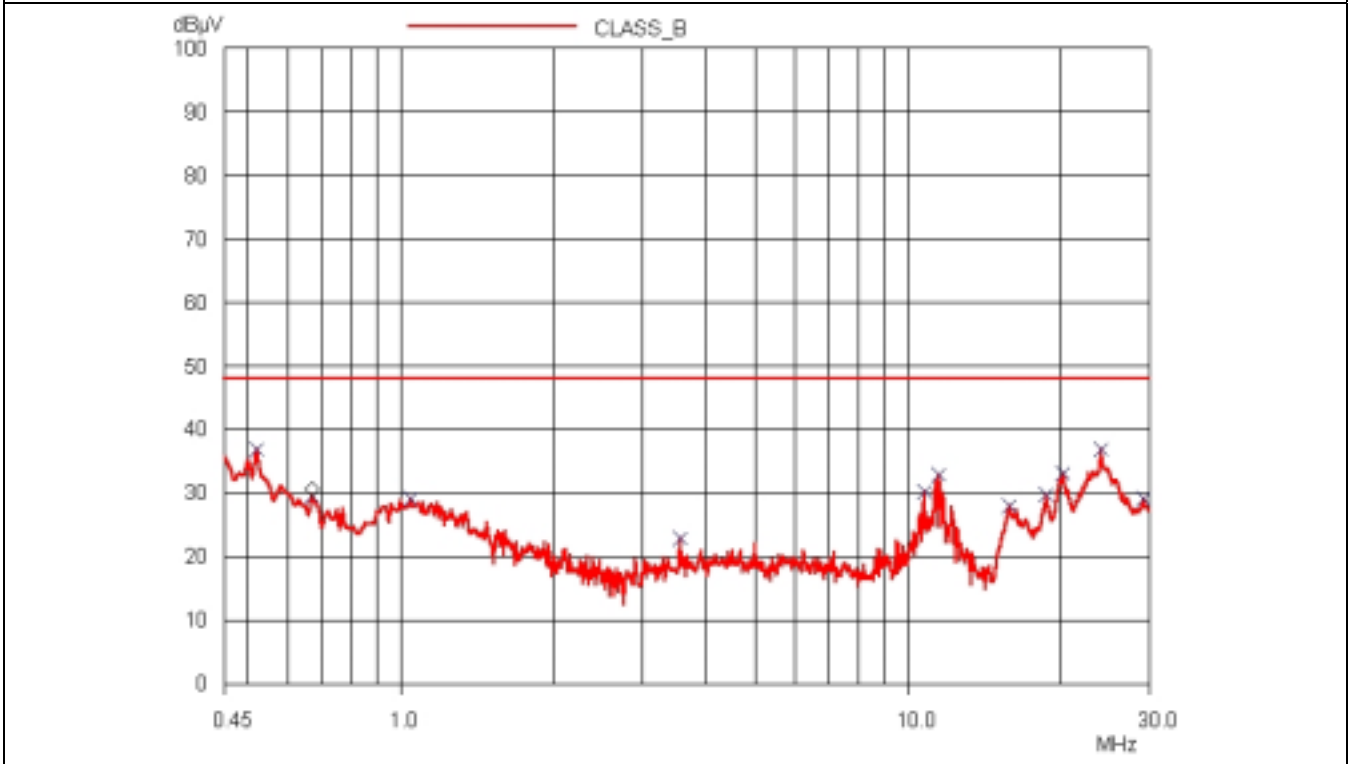

 Tested by: **Young-Min Choi / Project Engineer**



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HOT LINE



NEUTRAL LINE

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5.2 Radiated Emission Test

5.2.1 Within the permitted 200kHz band

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 51 % Temperature : 16 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239

Type of Test : Low Power Communication Device Transmitter

EUT : PERSONAL KARAOKE

Date: April 13, 2002

Operating Condition : FM TX MODE

Distance : 3 Meter

Radiated Emission			Ant Pol.	Correction Factors		Total Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Freq. (MHz)	Amp. (dBuV)	Detect Mode		Ant. (dBuV/m)	Cable (dB)			
106.3	37.90	Peak	H	13.15	1.18	52.13	68.00	-15.87
	32.40	Average	H	13.15	1.18	46.73	48.00	-1.27
107.5	37.70	Peak	H	13.42	1.19	52.31	68.00	-15.69
	32.30	Average	H	13.42	1.19	46.91	48.00	-1.09

Radiated Emission Tabulated Data



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5.4 Bandwidth of the operating frequency

Humidity Level : 49 % Temperature : 19 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239
Result : PASSED

EUT : PERSONAL KARAOKE Date: April 15, 2002
Operating Condition : FM TX MODE
Minimum Resolution
Bandwidth : 10 kHz

Remark: Please see following pages of plotted data marked the bandwidth of 200kHz points.


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