ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test report file number	**: E059R-002**
Applicant	**: Seoby Electronics Co, Ltd.**
Address	**: 38-2 Anyang2-dong, Manan-gu, Anayang-city Gyeonggi-Do, Korea**
Manufacturer	**: Seoby Electronics Co, Ltd.**
Address	**: 38-2 Anyang2-dong, Manan-gu, Anayang-city Gyeonggi-Do, Korea**
Type of Equipment	**: Juke Box Remote Controller**
FCC ID	**: SCBRCJB3**
Model / Type No.	**: RC-JB-3**
Serial number	**: N/A**
Total page of Report	**: 13 pages (including this page)**
Date of Incoming	**: August 30, 2004**
Date of issuing	**: September 1, 2005**

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C §15.227.**

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/ Chief Engineer
EMC Div.
ONETECH Corp.

Reviewed by:
Y. K. Kwon/ Director
EMC Div.
ONETECH Corp.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Site : 426-1 Daessangryung-Ri, Chowol-Eup, Gwangju-Gun, Gyeonggi-Do 464-862 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

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1. VERIFICATION OF COMPLIANCE

APPLICANT	: Seoby Electronics Co, Ltd.
ADDRESS	: 38-2 Anyang2-dong, Manan-gu, Anayang-city Gyeonggi-Do, Korea
CONTACT PERSON	: Min Cheal Lee
TELEPHONE NO	: 82-31-474-8001
BUYER NAME	:TouchTunes Music
ADDRESS	: 3 Commerce Place, 4th Floor Montreal, Quebec H3E 1H7 Canada
FCC ID	: SCBRCJB3
MODEL NO/NAME	: RC-JB-3
SERIAL NUMBER	: N/A
DATE	: September 1, 2005

EQUIPMENT CLASS	DXX-Part 15 Low Power Communication Transmitter
KIND OF EQUIPMENT	Juke Box Remote Controller - INTENTIONAL RADIATOR
THIS REPORT CONCERNS	CLASS II PERMISSIVE CHANGE
MEASUREMENT PROCEDURES	ANSI C63.4/2003
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C §15.227 and §15.231
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

This device is composite device, but the only parts subject to 15.227 were changed, so the other part subject to 15.231 was not issued.

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 Seoby Electronics Co, Ltd., Model RC-JB-3 (referred to as the EUT in this report) is a Juke Box Remote Controller that has 2 carrier frequencies, 27.145 MHz and 433.92MHz, but the EUT will not transmit simultaneously. The default carrier frequencies are 433.92 MHz and if user wants to change carrier frequency 433.92MHz to 27.145MHz, the user shall be pressing a combination key. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX FREQUENCY	27.145 MHz and 433.92 MHz
MODULATION	AM for 27.145 MHz and FSK for 433.92MHz
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	27.145, 6.78 and 4.0 MHz
ANTENNA TYPE	Built-in on the PCB in the EUT
TRANSMISSION TIME	Not longer than 5 sec
RATED SUPPLY VOLTAGE	DC 3V (2 X AAA 1.5 V Alkaline Battery)
OPERATING VOLTAGE RANGE	DC 2.5 ~ 3.2V
NUMBER OF LAYERS	1 Layer for PCB Board, SBDB-6100-10006 2 Layers for PCB Board, SBDB-6011-10007
FUNCTION OF BUTTON	Total 29 keys with Indicator LED

Remark: This equipment automatically deactivates the transmitter within not more than 5 second of being released.

2.2 Model Differences:

No other model differences have been mentioned

2.3 Related Submittal(s) / Grant(s)

- Class II Permissive Change

Following Modification were occurred in the EUT.

1. Output TR was changed from KTC4881 to BFG235 at Q3.
2. Supply voltage was changed from DC 3V to DC 5V. For changing supply voltage, DC/DC Converter (RT9261-50CB at U2) was added.
3. 27.145MHz Crystal was changed from 20 ppm specification to 15ppm.

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2.4 Test System Details

The EUT was tested with the following all equipment used in the tested systems are: None.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4/2001. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 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 October 02, 2002. (Registration Number: 529838)

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
Digital Board	Seoby Electronics Co., Ltd	SBDB-6100-10006	N/A
RF Board	Seoby Electronics Co., Ltd	SBDB-6100-10010	N/A

3.2 EUT exercise Software

To get a maximum radiated emission from the EUT, the button on the EUT was continuously pressed to transmit the signal. To activate continuous transmission, place a small plastic block between rubber band and the push button on the EUT.

To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

3.3 Equipment Modifications

None

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3.4 Configuration of Test System

Line Conducted Test: It needs not to test this requirement, because the EUT supplies from a DC battery.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/2001 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 50 kHz/division frequency span, 10 kHz resolution bandwidth and 10dB/division logarithmic display from an 8568B spectrum analyzer.

3.5 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 transmitter antenna of the EUT is built-in on the PCB in the EUT, no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
N/A	N/A
It is not need to test this requirement, because the power of the EUT is supplied from a DC battery.	

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

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

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5. TEST SETUP AND PROCEDURE

5.1 Test Setup

The EUT is placed on the wooden table. The antenna to the EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4/2003.

The EUT was continuously transmitted.

5.2 Test Procedure

For measurements below 30 MHz, the resolution bandwidth is set to 9 kHz and for the measurements above 30MHz and below 1000 MHz, the resolution bandwidth is set to 100 kHz for peak detection measurement or 120 kHz for quasi-peak detection measurement. Peak detection is used unless otherwise noted as quasi-peak.

For above 1000MHz, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurement and 10Hz for average measurement.

The radiated emissions measurements were on the 3 meters, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 9 kHz to 3000MHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

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6. FINAL RESULT OF MEASURMENT

6.1 Field Strength of the Carrier Test

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

Humidity Level : 49 % Temperature: 25°C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.227

Type of Test : Intentional Radiator

Result : PASSED BY –29.55 dB with Average detector

EUT : Juke Box Remote Controller Date: August 31, 2005

Operating Condition : TX mode

Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors			Total	FCC Limit	
Carrier Freq. (MHz)	Amplitude (dBuV)	Detector Mode	Pol.	Ant. (dB/m)	Cable (dB)	Average Level Factor	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
27.15	53.50	Peak	H	8.75	0.5	N/A	62.75	100	-37.25
27.15	38.50	Average	H	8.75	0.5	N/A	47.75	80	-32.25
27.15	55.80	Peak	V	8.75	0.5	N/A	65.05	100	-34.95
27.15	41.20	Average	V	8.75	0.5	N/A	50.45	80	-29.55

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

"Q.P." : Quasi-Peak, "H": Horizontal Polarization, "V": Vertical Polarization

Tested by: Young-Min, Choi / Senior Engineer

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6.2 Spurious Emission Test

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

Humidity Level : 49 % Temperature: 25°C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
Type of Test : Intentional Radiator
Result : PASSED BY –7.55dB at 54.27 MHz

EUT : Juke Box Remote Controller Date: August 31, 2005
Operating Condition : TX mode
Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit(dBuV/m)	
Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
26.95	13.90	P	V	8.75	0.50	23.15	49.54	-26.39
27.70	12.40	P	V	8.75	0.50	21.65	49.54	-27.89
54.27	21.80	P	V	9.24	1.41	32.45	40.00	-7.55
81.42	17.30	P	V	6.99	1.73	26.02	40.00	-13.95
135.72	14.60	P	H	14.37	2.31	31.28	40.00	-8.72
162.85	12.30	P	H	15.40	2.40	30.10	40.00	-9.90
325.77	10.90	P	H	14.05	4.01	28.96	47.00	-18.04
380.07	12.10	P	H	15.01	4.32	31.43	47.00	-15.57
Other spurious frequencies were not found up to 3000 MHz.								

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: Young-Min, Choi / Senior Engineer

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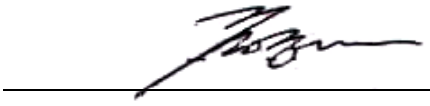
6.3 Bandwidth of the operating frequency

Humidity Level	: 47 %	Temperature: 22°C
Limits apply to	: FCC CFR 47, PART 15, SUBPART C, SECTION 15.227 (b)	
Type of Test	: Intentional Radiator	
Result	: PASSED	

EUT	: Juke Box Remote Controller	Date: August 31, 2005
Operating Condition	: TX mode	
Minimum Resolution Bandwidth	: 1 kHz	

Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
27.15	6.5 kHz	None	The point 20dB down from the modulated carrier

Remark: Please refer to plotted data, which shows the fundamental emission is confined in the specified band. And it shows that the emission is at least 49 dB below the carrier level at the band edge. It meets the requirement of Section 15.227(b).



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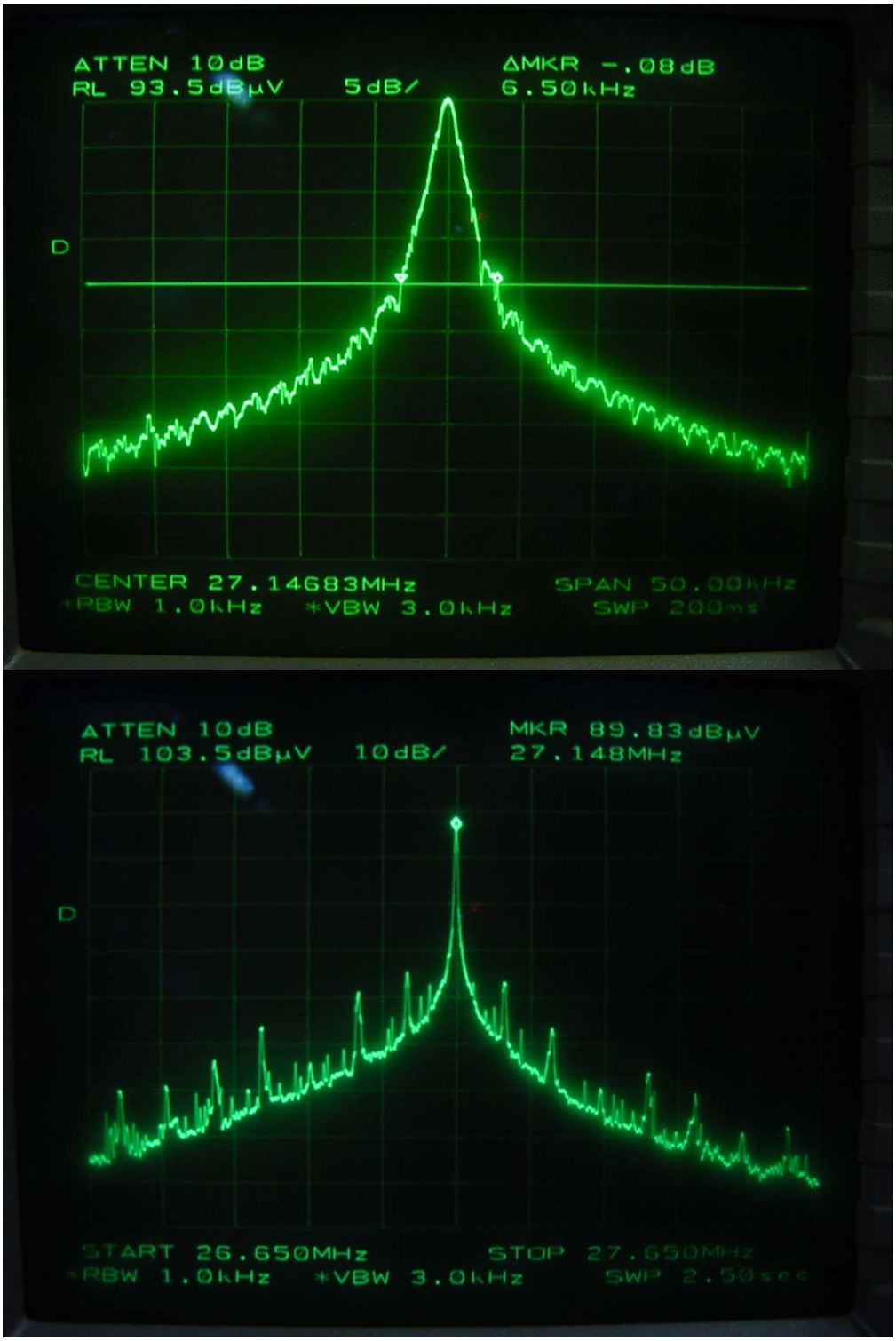
Plotted Data



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7. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+	Meter reading	(dBuV)
+	Cable Loss	(dB)
+	Antenna Factor (Loss)	(dB/meter)
=	Corrected Reading	(dBuV/meter)
-	Specification Limit	(dBuV/meter)
=	dB Relative to Spec	(+/- dB)

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8. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	NOV/05	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APR/05	12MONTH	■
3.	Spectrum analyzer	HP	8567A	3021A00773	JUL/05	12MONTH	■
4.	RF Pre-selector	HP	85685A	3107A01268	JUL/05	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01550	JUL/05	12MONTH	■
6.	Biconical Antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	JUL/05	12MONTH	■
7.	Log Periodic Antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	JUL/05	12MONTH	■
8.	Loop Antenna	EMCO	6502	9108-2668	FEB/05	24 MONTH	■
9.	Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA9120D294	JUN/05	12MONTH	
10.	LISN	EMCO	3825/2	9109-1867 9109-1869	AUG/05	12MONTH	
11.	RF Amplifier	HP	8347F	3307A01354	JUN/05	N/A	
12.	Spectrum Analyzer	HP	8564E	3650A00756	JUL/05	12MONTH	■
13.	Spectrum Analyzer	HP	8566B	3407A08547	AUG/05	12MONTH	
14.	Plotter	HP	7475A	30052 22986	N/A	N/A	
15.	Position Controller	HD	HD100	100/788	N/A	N/A	■
16.	Turn Table	HD	DS420S	N/A	N/A	N/A	■
17.	Antenna Master	HD	HD240	N/A	N/A	N/A	■
18.	Isolation Transformer	Digitek Power	DPT	DPF-22027	N/A	N/A	■
19.	Isolation Transformer	Digitek Power	DPT	DPF-22028	N/A	N/A	■
20.	Frequency Converter	Digitek Power	VFS/DEFC	N/A	N/A	N/A	■

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