



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

Test report file number : E052R-009

Applicant : Seoby Electronics Co, Ltd.

Address : 38-2 Anyang2-dong, Manan-gu, Anayang-city Gyeonggi-Do, Korea

Manufacturer : Seoby Electronics Co, Ltd.

Address : 632-7, Seonggok-Dong, Ansan-Si, Gyungki-Do, 425-110 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 : 14 pages (including this page)


Date of Incoming : December 30, 2004

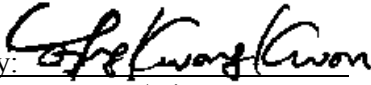
Date of issuing : February 3, 2005

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C §15.231**

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: 
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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 : February 3, 2005

DEVICE TYPE	Juke Box Remote Controller - INTENTIONAL RADIATOR
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/2001
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, so the other report covers the requirement of section 15.227.

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.



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)

None



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-6100-10007	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



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



5. FINAL RESULT OF MEASUREMENT

5.1 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 : 43 % Temperature: 17°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
 Type of Test : Intentional Radiator
 Result : PASSED BY -13.96 dB with Peak detector

EUT : Juke Box Remote Controller Date: January 10, 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)
433.92	59.50	Peak	H	16.61	3.47	12.69	66.89	80.83	-13.94
433.92	45.80	Peak	V	16.61	3.47	12.69	53.19	80.83	-27.64

*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

5.2 Maximum Modulation Percentage (MMP)

In order to determine possible Maximum Modulation Percentage from the EUT, we measured the duty cycle according to the clause I4.(10) in ANSI C63.4/1992.

The pulse train from the EUT was consisting of long and short pulse. The measured values are as follows.

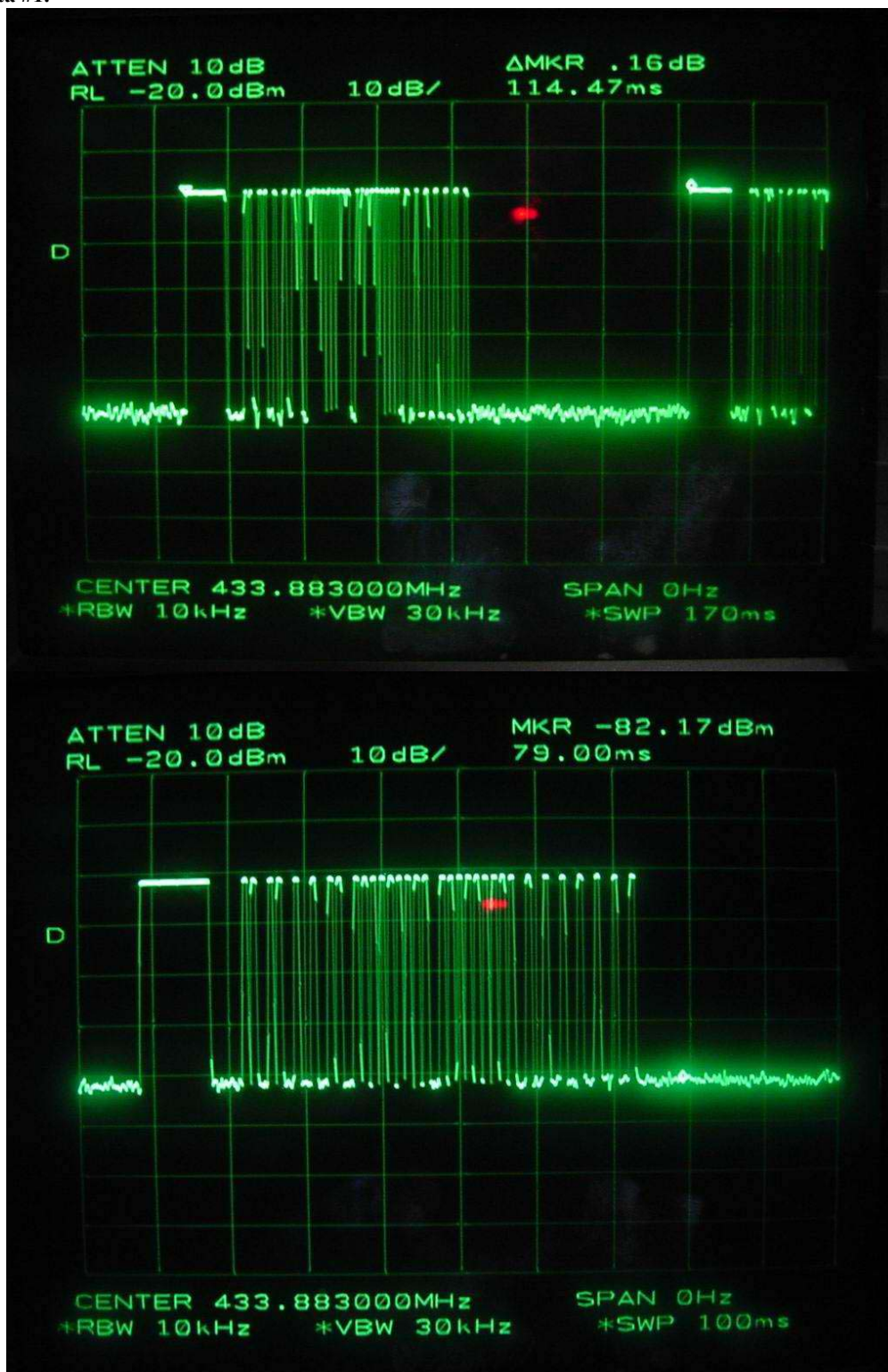
Long Pulse (LP)	Short Pulse (SP)	Total sum of LP	Total sum of SP	Pulse Width
8.867ms	0.433ms	1	33	114.47ms
Duty Cycle		$(8.867 + 33 \times 0.433) / 100 = 0.232$		
Maximum Modulation Percentage(MMP)		Duty Cycle X 100 % = 23.2 %		
Average Level Factor		-12.69 dB		

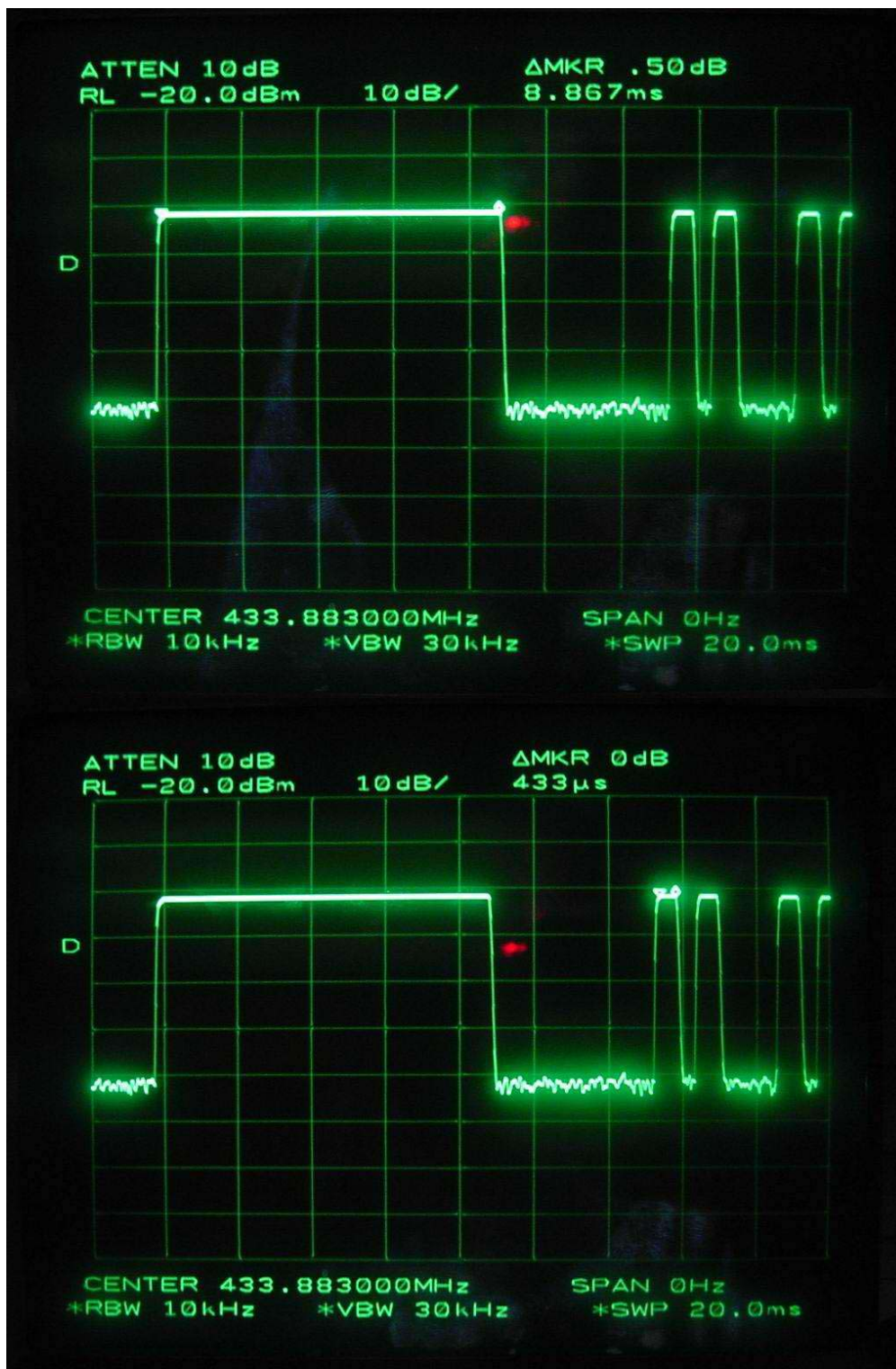
Remark: Please refer to Plotted Data #1.

Tested by: Young-Min, Choi / Senior Engineer



Plotted Data #1.







5.3 Spurious and Harmonic Emission Test according to 15.231

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

Humidity Level : 43 % Temperature: 17°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
 Type of Test : Intentional Radiator
 Result : PASSED BY -6.56dB at 871.0 MHz

EUT : Juke Box Remote Controller Date: January 10, 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)
210.00	15.40	Peak	H	16.43	2.32		34.15	43.52	-9.37
285.00	13.80	Peak	H	20.04	2.78		36.62	46.02	-9.40
375.10	15.95	Peak	H	15.16	3.28		34.39	46.02	-11.63
407.00	12.10	Peak	H	15.98	3.49		31.57	46.02	-14.45
490.00	10.80	Peak	H	17.52	3.65		31.97	46.02	-14.05
584.00	10.18	Peak	H	18.44	4.04		32.66	46.02	-13.36
871.00*	39.00	Peak	H	22.96	5.00	12.69	54.27	60.83	-6.56
Other spurious frequencies were not found up to 4400 MHz.									

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

Mark "*" means harmonic frequency of carrier frequency.

Tested by: Young-Min, Choi / Senior Engineer

**5.4 Bandwidth of the operating frequency**

Humidity Level : 43 % Temperature: 17°C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (c)
Type of Test : Intentional Radiator
Result : PASSED

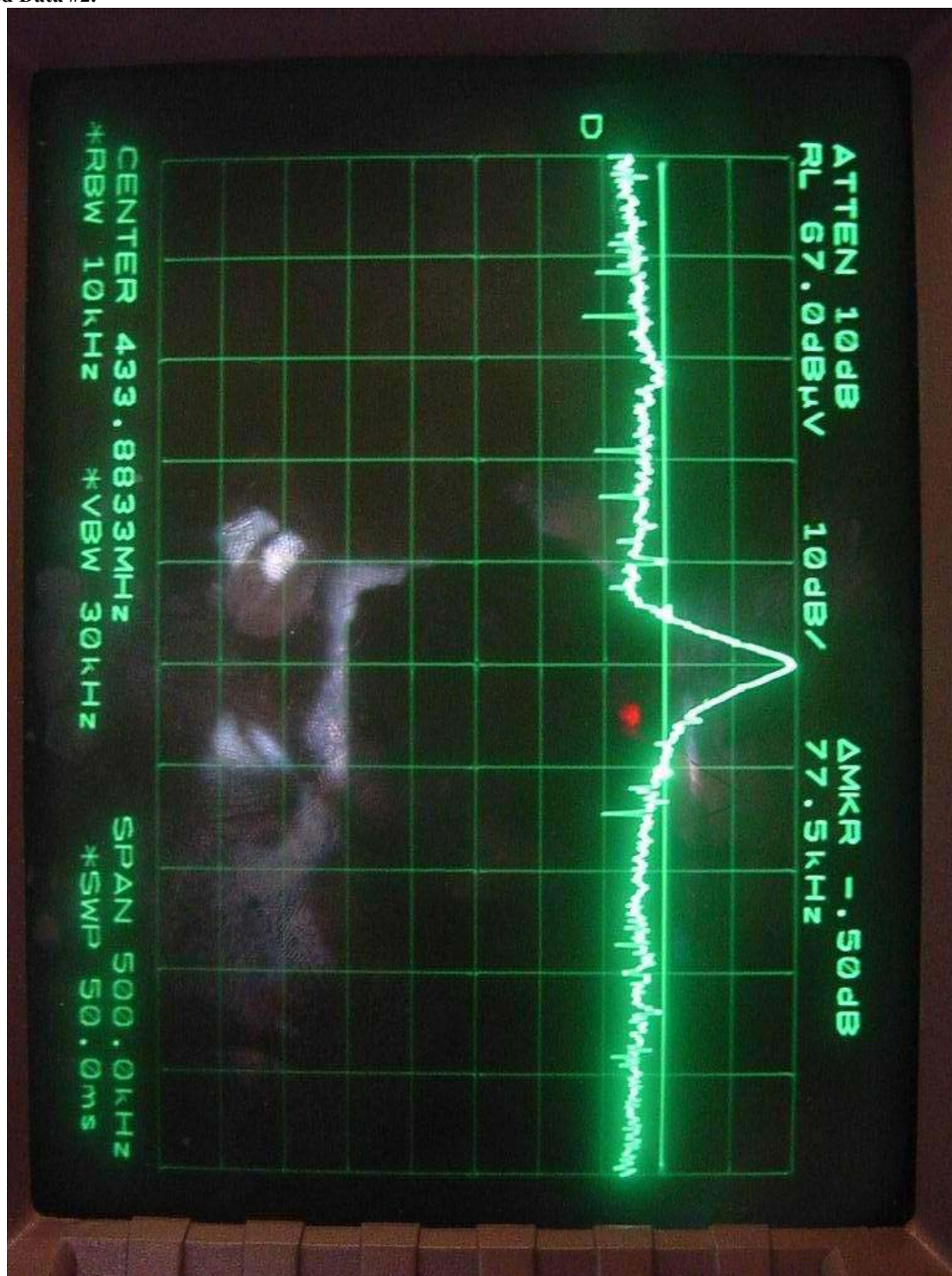
EUT : Juke Box Remote Controller Date: January 10, 2005
Operating Condition : TX mode
Minimum Resolution
Bandwidth : 10 kHz

Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
433.92	77.5	1084.8	<u>The point 20dB down from the modulated carrier</u>

Remark: Please refer to Plotted Data #1 for test data.

Tested by: Young-Min, Choi / Senior Engineer

Plotted Data #2.





6. 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)

**7. 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/04	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APR/04	12MONTH	
3.	Spectrum analyzer	HP	8567A	3021A00773	JUL/04	12MONTH	■
4.	RF preselector	HP	85685A	3107A01268	JUL/04	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01550	JUL/04	12MONTH	■
6.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	JUL/04	12MONTH	■
7.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	JUL/04	12MONTH	■
8.	Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA9120D294	JUN/04	12MONTH	■
9.	LISN	EMCO	3825/2	9109-1867 9109-1869	AUG/04	12MONTH	
10.	RF Amplifier	HP	8347F	3307A01354	JUN/04	N/A	
11.	Spectrum Analyzer	HP	8564E	3650A00756	JUL/04	12MONTH	■
12.	Spectrum Analyzer	HP	8566B	3407A08547	AUG/04	12MONTH	
13.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
14.	Position Controller	HD	HD100	100/788	N/A	N/A	■
15.	Turn Table	HD	DS420S	N/A	N/A	N/A	■
16.	Antenna Master	HD	HD240	N/A	N/A	N/A	■
17.	Isolation Transformer	Digitek Power	DPT	DPF-22027	N/A	N/A	■
18.	Isolation Transformer	Digitek Power	DPT	DPF-22028	N/A	N/A	■
19.	Frequency Converter	Digitek Power	VFS/DEFC	N/A	N/A	N/A	■