



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test Report No. : E045R-027

Applicant : Responsive Innovations, LLC

Address : 3789, Chesterfield Drive, Akron, OH 44319, United States

Manufacturer : Seoby Electronics Co., Ltd.

Address : #38-2, Anyang 2-Dong, Manan-Gu, Anyang-City, Kyungki-Do, Korea

Type of Equipment : Infrared Remote Control and Receiver System

FCC ID : R4WRR01

Model Name : RR01

Serial Number : N/A

Total page of Report : 11 pages (including this page)

Date of Incoming : May 06, 2004

Date of Issuing : March 11, 2004

SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART B, Class B**.

This test report contains only the results 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

Reviewed by:


Y. K. Kwon/ Director



ONETECH

Testing & Evaluation Lab.

Page 2 of 11

FCC ID. :

Report No. : E045R-027

EMC Div.
ONETECH Corp.

EMC Div.
ONETECH Corp.

It should not be reproduced except in full, without the written approval of ONETECH.

EMC-003 (Rev.0)

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 Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-

2

9

0

4

)



CONTENTS

	Page
1. VERIFICATION OF COMPLIANCE.....	4
2. GENERAL INFORMATION.....	5
2.1 PRODUCT DESCRIPTION.....	5
2.2 MODEL DIFFERENCES:	5
2.3 RELATED SUBMITTAL(S) / GRANT(S)	5
2.4 TEST SYSTEM DETAILS	5
2.5 TEST METHODOLOGY	5
2.6 TEST FACILITY	5
3. SYSTEM TEST CONFIGURATION.....	7
3.1 JUSTIFICATION	7
3.2 EUT EXERCISE SOFTWARE.....	7
3.3 CABLE DESCRIPTION	7
3.4 NOISE SUPPRESSION PARTS ON CABLE	7
3.5 EQUIPMENT MODIFICATIONS	7
3.6 CONFIGURATION OF TEST SYSTEM	8
4. PRELIMINARY TEST.....	8
4.1 AC POWER LINE CONDUCTED EMISSION TEST	8
4.2 RADIATED EMISSION TEST	8
5. FINAL RESULT OF MEASUREMENT	9
5.1 CONDUCTED EMISSION TEST.....	9
5.2 RADIATED EMISSION TEST	12
6. FIELD STRENGTH CALCULATION	13
7. LIST OF TEST EQUIPMENT.....	14

**1. VERIFICATION OF COMPLIANCE**

- APPLICANT : Responsive Innovations, LLC
- ADDRESS : 3789, Chesterfield Drive, Akron, OH 44319, United States
- CONTACT PERSON : Mr. Min-Cheal, Lee / Manager
- TELEPHONE NO : +82-31-474-8001
- FCC ID : R4WRR01
- MODEL NAME : RR01
- SERIAL NUMBER : N/A
- DATE : March 11, 2004

DEVICE TYPE	UNINTENTIONAL RADIATOR
E.U.T. DESCRIPTION	Infrared Remote Control and Receiver System
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, SECTION 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	NO
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.
- 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 Responsive Innovations, LLC, Model RR01 (referred to as the EUT in this report) is an Infrared Remote Control and Receiver System that consist of remote controller and receiver. The receiver is connected to a person computer. The EUT is a part of educational system, students using this system can transmit answers through it to PC remotely. Then a receiving part accepts the signal form the each student and passes it over to a PC. Finally, the PC save the answer and reconstructs them. 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)	Receiver	4 MHz
	Controller	
ELECTRICAL RATING	DC 5V(Receiver), DC 3V(Remote Control)	
CARRIER FREQ.	38 kHz	
OPERATING RANGE	Max. 30m	
EXTERNAL CONNECTOR	RS232	

2.2 Model Differences:

- None

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Test System Details

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

Model	Manufacturer	FCC ID	Description	Connected to
RR01	Seoby Electronics Co., Ltd.	R4WRR01	Infrared Receiver (EUT)	NOTEBOOK PC
RCIR01	Seoby Electronics Co., Ltd.	N/A	Infrared Remote Controller	-
PP05LC	DELL Computer Corp.	DoC	NOTEBOOK PC	-
2225C	HP	DSI6XU2225	PRINTER	PC

2.5 Test Methodology

Both conducted and 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,

It should not be reproduced except in full, without the written approval of ONETECH.

EMC-003 (Rev.0)

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 Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-



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
Receiver Board	Seoby Electronics Co., Ltd.	SBRAC-6100-10002	N/A
Remote Control Board	Seoby Electronics Co., Ltd.	SBDC-6100-10001	N/A

3.2 EUT exercise Software

-. After connecting the EUT to the Notebook PC, the signal was transmitted from the remote control to receiver continuously.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
Infrared Receiver (EUT)	N	Y	1.2 (D)
Infrared Remote Controller	N	N	-
NOTEBOOK PC	N	-	1.5 (P)
AC/DC ADAPTER (Notebook PC)	N	N	1.2(P), 1.0(D)
PRINTER	N	Y	1.8(P), 1.2(D)

* The marked "(P)" means the Power Cable and "D" means the I/O Cable.

3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
Infrared Receiver (EUT)	N	N/A	Y	EUT END
Infrared Remote Controller	N/A	N/A	N/A	N/A
NOTEBOOK PC	-	-	-	-
AC/DC ADAPTER (Notebook PC)	Y	Notebook PC END	Y	Notebook PC END
PRINTER	N	N/A	Y	BOTH END

3.5 Equipment Modifications

-. None



3.6 Configuration of Test System

Line Conducted Test : The receiver was connected to PC and the power line of PC was connected to LISN. And the remote control used the Lithium battery. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2001 7.2.3 to determine the worse operating conditions.

Radiated Emission Test : Preliminary radiated emission test was conducted using the procedure in ANSI C63.4: 2001 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

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)
After connecting the EUT to the Notebook PC, the signal was transmitted from the remote control to receiver continuously.	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)
After connecting the EUT to the Notebook PC, the signal was transmitted from the remote control to receiver continuously.	X



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 : 41 % Temperature: 21 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107 (a)
 Type of Test : CLASS B
 Result : PASSED BY -8.68 dB at 0.17 MHz under peak detector mode

EUT : Infrared Remote Control and Receiver System Date: May 04, 2004
 Operating Condition : The signal was transmitted from the remote control to receiver continuously.
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.17	H	56.04	64.72	-8.68
0.23	H	48.97	62.45	-13.48
0.29	H	43.60	60.38	-16.78
0.34	H	38.51	59.08	-20.57
4.36	H	35.58	56.00	-20.42
4.50	N	36.64	56.00	-19.36
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
0.17	H	43.45	54.72	-11.27
0.23	H	37.94	52.45	-14.51
4.36	H	26.01	46.00	-19.99
4.50	N	24.75	46.00	-21.25

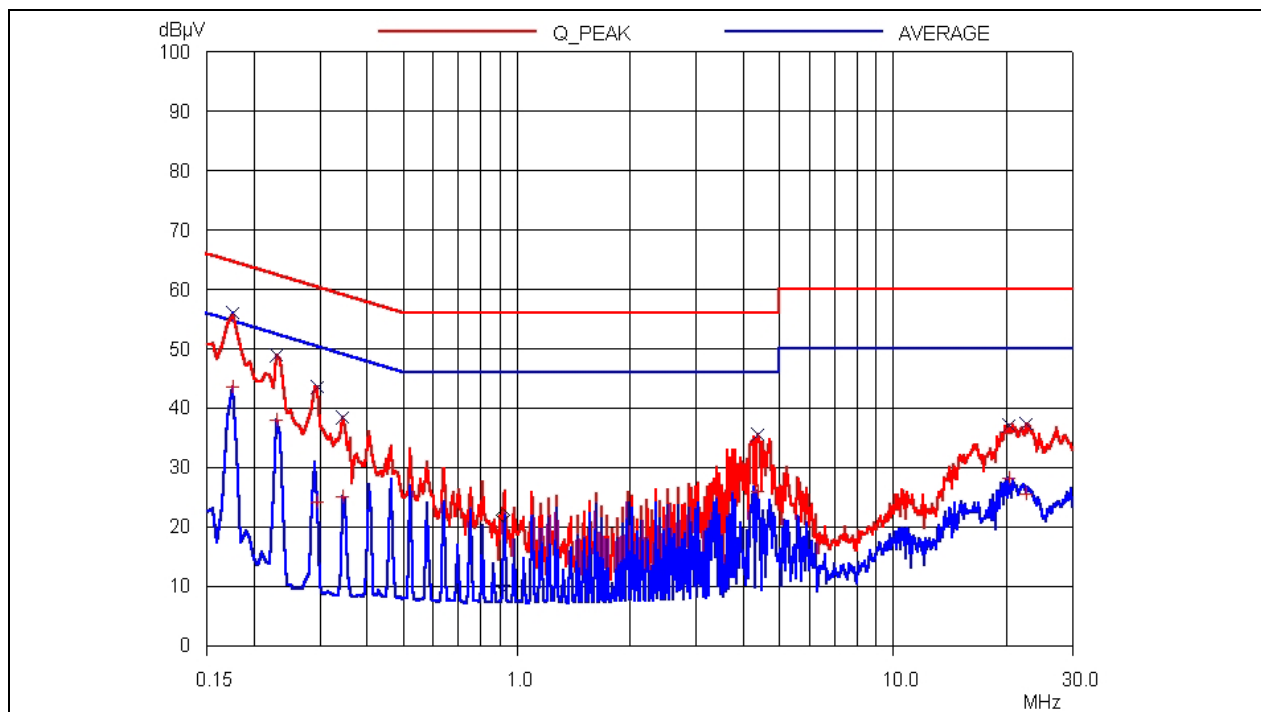
Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line

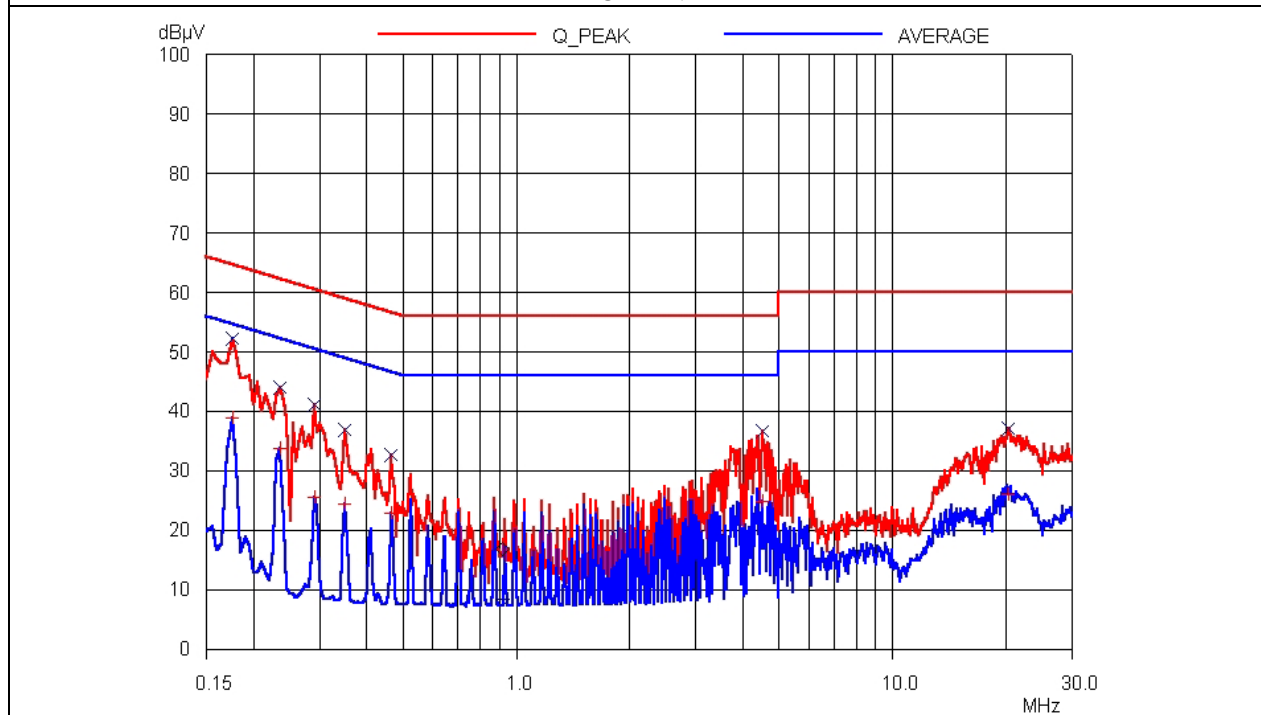
See next page for an overview sweep performed with peak and average detector.



Tested by: Sung-Chel, You / Test Engineer



HOT LINE



NEUTRAL LINE

It should not be reproduced except in full, without the written approval of ONETECH.

EMC-003 (Rev.0)

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 Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-

**5.2 Radiated Emission Test**

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

Humidity Level : 43 % Temperature: 22 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)
 Type of Test : CLASS B
 Result : PASSED BY -10.96 dB at 197.90 MHz

EUT : Infrared Remote Control and Receiver System Date: May 06, 2004
 Operating Condition : The signal was transmitted from the remote control to receiver continuously.
 Frequency range : 30MHz – 1000MHz
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Distance : 3 Meter

Radiated Emissions		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
150.32	15.20	V	14.11	2.00	31.31	43.50	-12.19
163.21	14.20	V	15.37	2.24	31.81	43.50	-11.69
197.90	13.40	V	16.74	2.40	32.54	43.50	-10.96

Radiated Emissions Tabulated Data

Tested by: Sung-Chel, You / Test Engineer



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/03	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/04	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	MAY/03	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	MAY/03	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	MAY/03	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	MAY/03	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/04	12MONTH	
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/03	12MONTH	■
				9109-4444	JUL/03		
		Schwarzbeck	VHA9103	91031852	JAN/04		
9.	Log Periodic antenna	EMCO	3146	9109-3213	FEB/04	12MONTH	
				9109-3214	JUL/03		■
				9109-3217	MAY/03		
		Schwarzbeck	9108-A(494)	62281001	JAN/04		
10.	LISN	EMCO	3825/2	9109-1867	AUG/03	12MONTH	■
				9109-1869	OCT/03		■
11.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
12.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
13.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■