TEST REPORT

Ref. Report No.
99-341-053-2

This test report only responds to the tested sample and shall not be reproduced except in full without written approval of the the Korea Testing Laboratory.

Name and address of the applicant

Radio Plus Co., Ltd.
174, Nae-Dong, Ohjung-Ku, Puchon-City, Kyungki-Do, Korea 421-160

Standard / Test regulation

FCC Part 15, Subpart B

Test result

Pass

Incoming date : October 29, 1999

Test date : November 2 ~ November 17, 1999

Test item(s) ;

Security/Remote Control Receiver (Car Alarm)

Model/type ref. ;

RCM-3000

Manufacturer ;

Radio Plus Co., Ltd.

Additional information ;

-Required Authorization :Certification
-FCC ID. :OT2RCM-3000R

Issue date : December 7, 1999

Tested and reported by

S. K. Seol

Soun-Kweon Seol , Senior Engineer

Reviewed by

S. J. Kim

Seok-Jin Kim , EMC Team Leader

KOREA TESTING LABORATORY

TABLE OF CONTENTS

. GENERAL INFORMATION

1. Grantee Name and Mailing Address : Radio Plus Co., Ltd.
174, Nae-Dong, Ohjung-Ku, Puchon-City
Kyungki-Do, Korea 421-160

2. Manufacturer's Name and Mailing Address : Radio Plus Co., Ltd.
174, Nae-Dong, Ohjung-Ku, Puchon-City
Kyungki-Do, Korea 421-160

3. Equipment Descriptions

3.1 Tuning Frequency : 434.79 MHz
3.2 Detector Method : Superheterodyne Detector
3.3 Local Oscillator : 1st Local Osc. Frequency = Tuning Frequency - 21.4MHz(1st IF)
2st Local Osc. Frequency = 20.945MHz(2nd IF : 455KHz)
3.4 Power Supply : DC 1.5V (Battery)
3.5 Additional Information ;
- Cristal used : 1 st Local Cristal(434.79MHz –21.4MHz) / 9 = 45.9322MHz
2 st Local Cristal = 20.945 MHz

4. Rules and Regulations : FCC Part 15, Subpart B

5. Measuring Procedure : ANSI C63.4-1992

6. Place of Measurement : Absorber-lined room(3-Meter) of KTL

7. Date of Measurement

7.1 Conducted Emission : Not Applicable
7.2 Radiated Emission : November 17, 1999

. GENERAL REQUIREMENTS OF THE EUT

1. Labelling Requirement (Section 15.19)

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

1.1 Location on Enclosure : Manual for Installation and Operating Instruction

1.2 How Applied : Printing

2. Information to User (Section 15.21)

The following or similar statements were provided in the manual for user instruction.

Please refer page 1 of the attached manual for details.

CAUTION : Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. Special Accessories (Section 15.27)

3.1 Were the special Accessories provided? [ ] yes, [x] no

3.2 If yes, details for the special accessories are as follows :

3.3 If yes, were the appropriate instructions provided on the first page of the text concerned with the device?

[ ] yes, [ ] no

3.4 Are these accessories provided of the type which can be readily obtained from multiple retail outlets ?

[ ] yes, [ ] no

And therefore does the manual specify what additional components or accessories are required to used in order to comply with the Rules?

[ ] yes, [ ] no

. RADIATED EMISSION MEASUREMENT (Section 15.109)

1. Test Procedure

1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna(Biconical antenna : 30 to 300MHz, Log-periodic antenna : 200 to 1000MHz or Horn Antenna : 1 to 18GHz) was placed at the distance of 1 meter from the EUT.

The measurement was performed with main controller was connected. An attempt was made to maximize the emission level with the various configurations of the EUT. The position of connecting cables and antenna of the EUT was changed to find the worst case configuration that produces maximum emission level from the EUT while rotating the table and varying antenna height.

Emissions level from the EUT with various configurations were examined on a Spectrum Analyzer connected with a RF amplifier and graphed by a plotter.

1.2 Final Radiated Emission Test at a Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

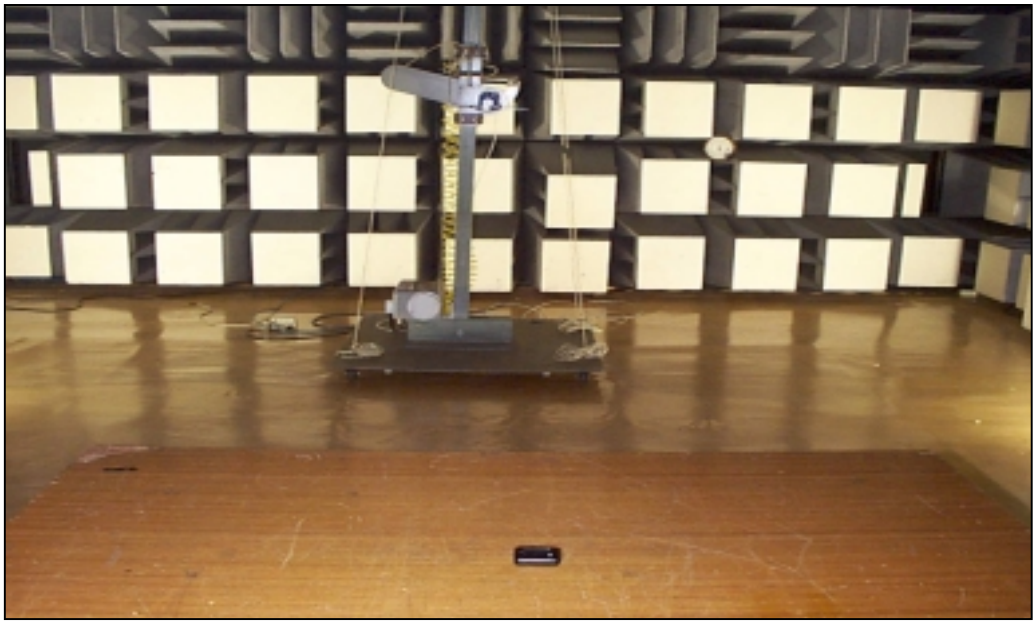
Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver or spectrum analyzer(for above 1GHz) with a RF amplifier.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor(20dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

2. Photograph for the worst case configuration



3. Sample Calculation

The emission level measured in decibels above one microvolt (dB) was converted into microvolt per meter (/m) as shown in following sample calculation.

For example :

	Measured Value at 413.39MHz	33.5 dB	
+	Antenna Factor		21.0 dB
+	Cable Loss		3.8 dB
-	Preamplifier		30.0 dB
-	Distance Correction Factor *		0.0 dB
=	Radiated Emission	28.3 dB /m	
		(=26.0 /m)	

* Extrapolated from the measured distance(1.0m) to the specified distance(3m) by an inverse linear distance extrapolation.

4. Measurement Data

4.1 Tuning Frequency (434.79MHz)

- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 120kHz for 1GHz below)
  x Peak (3dB Bandwidth : 1MHz for 1GHz above)
- Measurement Distance : 3 Meter

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dB)	* A.F. + C.L (dB)	* A.G. (dB)	* D.C.F. (dB)	Emission Level (dB /m)	Emission Level (/m)	Limit (/m)	** Margin (dB)
413.39	Q	H	33.5	24.8	-30.0	-	28.3	26.0	200	-17.7
*** 826.78	Q	H	32.5	33.5	-30.0	-9.5	26.5	21.1	200	-19.5
*** 1240.17	P	V/H	**** <40.0	31.6	-35.0	-9.5	<27.1	<22.6	500	<-26.9
*** 1653.56	P	V/H	**** <40.0	34.4	-35.0	-9.5	<29.9	<31.3	500	<-24.1
*** 2066.95	P	V/H	**** <40.0	37.3	-35.0	-9.5	<32.8	<43.7	500	<-21.2
*** 2480.34	P	V/H	**** <40.0	39.6	-35.0	-9.5	<35.1	<56.9	500	<-18.9

Note

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor

** Margin (dB) = Emission Level (dB) - Limit (dB)

*** In the case of these frequencies, the EUT was measured at 1.0m distance for sufficent sensitivity of measurement system.

**** < means less than. The observed spectrum analyzer nois floor level with RF preamplifier was 40.0 dBuV

. TEST EQUIPMENT USED FOR MEASUREMENTS

Equipment	Model No.	Manufacturer	Serial No.	Effective Cal. Duration
[x] EMI Receiver (20MHz-1GHz)	ESVS30	R & S	830516/002	06/29/99-06/29/00
[x] Spectrum Analyzer (9kHz-26.5GHz)	8563A	H. P.	3222A02069	02/10/99-02/10/00
[x] Spectrum Analyzer (100Hz-22GHz)	8566B	H. P.	3014A07057	05/29/99-05/29/00
[x] Quasi-Peak Adapter (10kHz-1GHz)	85650A	H. P.	3107A01511	05/29/99-05/29/00
[x] RF-Preselector (20Hz-2GHz)	85685A	H. P.	3010A01181	05/29/99-05/29/00
[ ] Test Receiver (9kHz-30MHz)	ESH3	R & S	860905/001	06/29/99-06/29/00
[x] Pre-Amplifier (0.1-3000MHz, 30dB)	8347A	H. P.	2834A00543	05/29/99-05/29/00
[x] Pre-Amplifier (1-26.5GHz, 35dB)	8449B	H. P.	3008A00302	06/29/99-06/29/00
[ ] LISN(50 , 50 H) (10kHz-100MHz)	3825/2	EMCO	9010-1710	-
[ ] LISN(50 , 50 H) (10kHz-100MHz)	3825/2	EMCO	9011-1720	-
[x] Plotter	7470A	H. P.	3104A21292	-
[x] Tuned Dipole Ant. (30MHz-300MHz)	VHA 9103	Schwarzbeck	-	*
[x] Tuned Dipole Ant. (300MHz-1GHz)	UHA 9105	Schwarzbeck	-	*
[x] Biconical Ant. (30MHz-300MHz)	BBA 9106	Schwarzbeck	-	*
[x] Log Periodic Ant. (200MHz-1GHz)	3146	EMCO	-	*
[x] Horn Ant. (1GHz-18GHz)	3115	EMCO	-	*
[ ] DC Power Supply	6260B	H.P.	1145A04822	-
[ ] Audio Generator	LAV-190	LEADER	5020297	06/29/99-06/29/00
[ ] Volt Meter	3438A	H.P.	1717A-00613	06/16/99-06/16/00
[x] Shielded Room (5.0m x 4.5m)	-	SIN-MYUNG	-	-

* Each set of antennas has been calibrated to ensure correlation with ANSI C63.5 standard. The calibration of antennas is traceable to Korea Standard Research Institute(KSRI).