

TEST REPORT

1. Applicant

Name : SEGI LIMITED
Address : Room 1808, 18/F, Tower 2, Admiralty Center, 18
Harcourt road, Hongkong City,186, CHINA

2. Products

Name : Security/Remote Control transmitter(Car Alarm System)
Model/Type : MR120
Manufacturer : SEGI LIMITED

3. Test Standard

: FCC CFR 47 Part 15, Subpart C section 15.231(a) &
IC RSS 210 Annex I-2007

4. Test Method

: ANSI C63.4-2003, RSS-GEN-2007

5. Test Result

: Positive

6. Date of Application

: June 01, 2007

7. Date of Issue

: Nov 12, 2007

Tested by



Sung-Kyu Cho

Telecommunication Team
Engineer

Approved by



Seok-Jin Kim

Telecommunication Team
Manager

The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.

Korea Testing Laboratory

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I . GENERAL INFORMATIONS

1.1 Applicant (Client)

Name	SEGI LIMITED
Address	Room 1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt road, Hongkong City,186, CHINA
Contact Person	Byung joon - Ko
Telephone No.	+86-769-8322-4133(175)
Facsimile No.	+86-769-8322-4130
E-mail address	byungjoon@magicar.com

1.2 Equipment (EUT)

Type of equipment	Security/Remote Control transmitter(Car Alarm System)
Model Name	MR120
FCC ID	VA5JR120AM433
IC ID	7087A-R120AM
Operating Frequency	433.92 MHz
Antenna Type	Internal
EUT Modes of Operation	Transmitter
Type of Signal	Pulse Coded Signal
Type of Modulation	ASK
Power Source	DC 12 V (Battery)
Manufacturer Name	SEGI LIMITED
Manufacturer Address	Chenjiapucun, Liaobu Town, Dongguan City, Guangdong Province, P.R.China(523-408)

1.3 Testing Laboratory

Testing Place	Korea Testing Labortory (KTL) 516 Haeon-ro, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do, 426-901, KOREA
Test Engineer	Sungkyu Cho
Telephone number	+82 31 500 0312
Facsimile number	+82 31 500 0159
E-mail address	skcho@ktl.re.kr
Other Comments	

II. SUMMARY OF TEST RESULTS

Testing performed for : SEGI Limited

Equipment Under Test : MR120

Receipt of Test Sample : September 01, 2007

Test Start Date : October 16, 2007

Test End Date : October 30, 2007

The following table represents the list of measurements required under the FCC CFR47 Part 15.231 & RSS 210 Annex I.

FCC	IC	DESCRIPTION OF TEST	Result
15.231(a)	A1.1.1	Transmission Requirements	Pass
15.231(b)	A1.1.2	Transmitter Radiated Emissions – Fundamental, Harmonic and Spurious	Pass
15.231(c)	A1.1.3	20 dB & 99% Bandwidth	Pass

Note 1 : Test results reported in this document relate only to the items tested

Note 2 : The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

Note 3 : Test results apply only to the item(s) tested

*** Modifications required for compliance**

No modifications were implemented by KTL.

All results in this report pertain to the un-modified sample provided to KTL.

III. TEST FACILITY

3.1 Korea Testing Laboratory test location

All tests were conducted at Korea Testing Laboratory. The site address is 516 Hae-an-ro, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do, 426-901, KOREA. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1:1993 and ANSI C63.4: 1992. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.



The FCC registration number is 408324. The Industry Canada filing number for this site is 6298.

3.2 Test Equipment

No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver	R&S	ESCI	100164	08/24/2008
2	Amplifier	Sonoma Instrument Co.	310N	186270	08/25/2008
3	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-179	04/06/2009
4	Horn Ant. (1 GHz ~ 18 GHz)	Agilent	E4448A	MY43360322	02/26/2008
5	Antenna Mast	Frankonia	FAM4	1101F4006	--
6	Pre-Amplifier (100 kHz ~ 3 GHz)	H.P.	8347A	2834A00543	05/19/2008
7	Spectrum Analyzer	Agilent	E4407B	US41443316	12/01/2007

IV. TEST RESULTS

4.1 Transmission Requirements (FCC Part 15.231(a) & RSS-210 A1.1.1)

4.1.1 Limit of Transmission Time

- According to 15.231(a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being release.
- According to 15.231(a)(2), a transmitter activated automatically shall cease transmission within 5 seconds after activation.

4.1 Field Strength Measurements (FCC Part 15.231(a) & RSS-210 A1.1.2)

4.1.1 Test procedure

- Measurements were made over the frequency range of 30 MHz to ten times the highest frequency operating within the device.
- The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.
- From 30 to 1000 MHz, a quasi-peak detector was used for measurement. Above 1000 MHz, average Measurements were performed.
- The antenna is adjusted between 1m and 4m in height above the ground plane for maximum field-strength readings.
- The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.
- The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.
- The EUT was placed on a wooden table 80 cm above the ground reference plane.
- Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.
- The bandwidths of the fundamental emissions were measured 20 dB down from the modulated carrier using the ANSI C63.4 specified bandwidths. The bandwidth measurement was performed using a peak detector and the peak-hold function of the analyzer.
- The readings obtained from the measurement receiver were corrected for antenna factor, cable loss, and pre-amp gain.

4.1.2 Field strength calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

Where : FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL + AG

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

4.1.3 Limits

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500**	50 to 150**
174-260	1,500	150
260-470	1,500 to 5,000**	150 to 500**
Above 470	5,000	500

** linear interpolations

4.1.4. Test Results

The MR120 met the field strength and bandwidth requirements of FCC § 15.231 for fundamental and spurious emissions. See Table 4-1 for the measured fundamental and spurious emissions. The peak value of the fundamental and spurious emissions did not exceed the limits of FCC § 15.231 (5)(b). Additionally, there were no radiated emissions from the device in the restricted bands of § 15.205 which exceeded the limit of § 15.209. All other spurious emissions not shown below were greater than 20 dB bandwidth of the fundamental emission was less than 0.25% of the carrier frequency.

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dB μ V)	* A.F. + C.L. (dB/m)	* A.G. (dB)	* D.C.F. (dB)	Emission Level		Limit (dB μ V/m)	** Margin (dB)
							(dB μ V/m)	(μ V/m)		
433.90	P	H	30.76	18.6	0.0	0.0	49.36	293.8	80.8	-31.4
433.90	P	V	41.05	18.6	0.0	0.0	59.65	960.5	80.8	-21.2
867.69	P	H	31.83	26.6	0.0	0.0	58.43	834.6	60.8	-2.4
867.69	P	V	32.56	26.6	0.0	0.0	59.16	907.8	60.8	-1.6
1301.37	P	H	50.85	29.8	-30.2	0.0	50.45	333.0	54.0	-3.6
1301.37	P	V	50.73	29.8	-30.2	0.0	50.33	328.5	54.0	-3.7
1735.33	P	H	53.85	32.2	-30.2	0.0	55.85	620.2	60.8	-4.9

Note

The observed EMI receiver(ESVS30) noise floor level was 2.0 dB μ V. And all other emissions not reported on data were more than 25 dB below the permitted level.

- * 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
- < : Less than

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

Table 4-1. Fundamental and Spurious Radiation

Note ;

- (1) Fundamental emissions from the intentional radiators were not located within any of frequency bands described in section 15.205(a) listed below ;

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.1775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
13.36-13.41			

The field strength of emissions appearing within above frequency bands did not exceed the limits shown in section 15.209. At frequency equal to or less than 1000MHz, compliance with the limits section 15.209 was demonstrated using measurement employing a CISPR quasi-peak detector. Above 1000MHz, demonstrated based on the average value of the measured emissions.

- (2) If the intentional radiator was operated under the radiated emission limits of the general requirements of section 15.209, it's fundamental emissions were not located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-860MHz.
- (3) The level of any unwanted emissions from an intentional radiator did not exceed the level of the fundamental emission.
- (4) Radiated and spurious emissions were checked from 30MHz to 3GHz. And all other emissions not reported on data were more than 20 dB below the permitted level.

5. Bandwidth of Momentary Signals (FCC Part 15.231(c) & RSS-210 A.1.1.3)

5.1 Limit

The 99% bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70~900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency.

1. Carrier Frequency = 433.92 MHz
2. The bandwidth of emission shall be no wider than 0.25 % of center frequency.
3. Limit : less than 1.0848 MHz (433.92 x 0.025)

5.2 Test result (FCC Part 15.231(c))

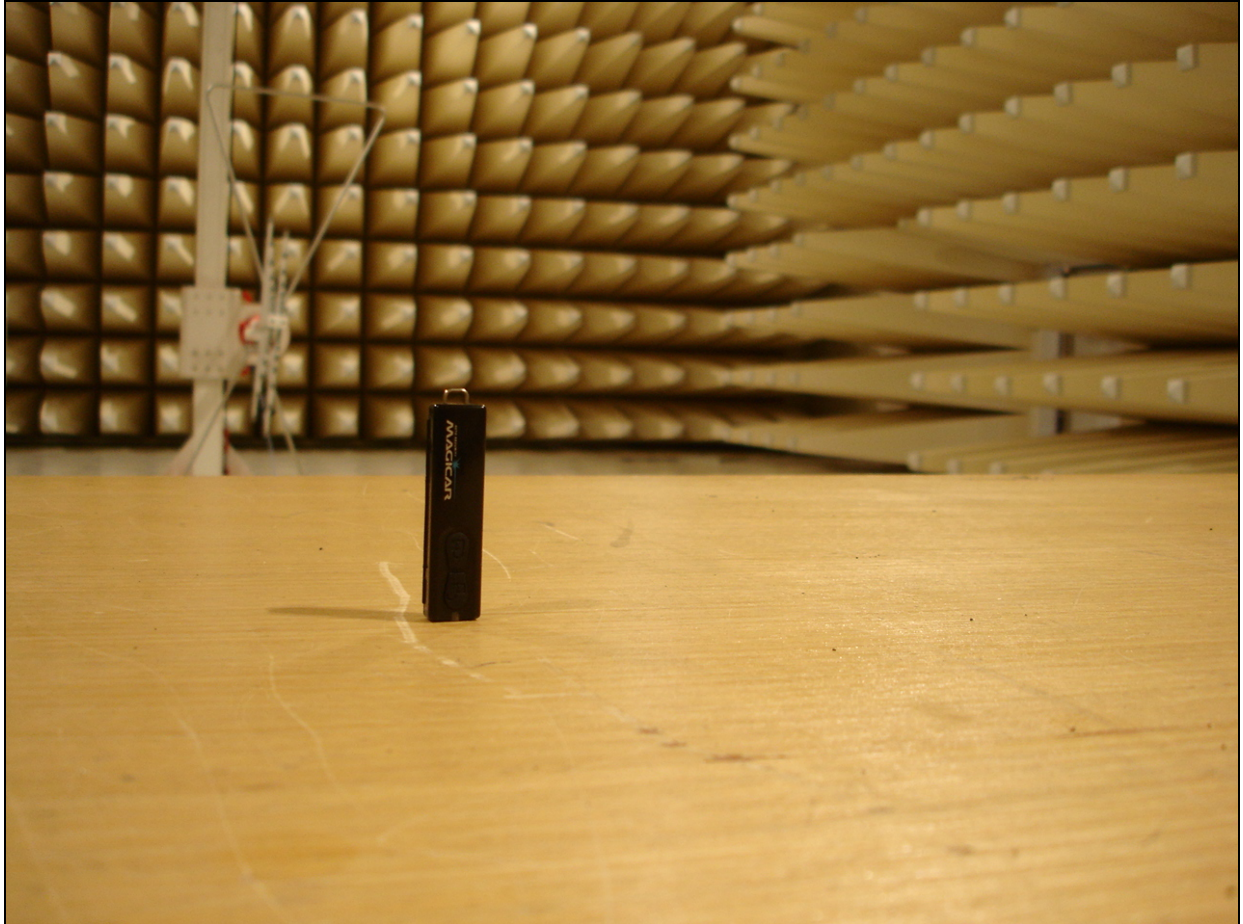
Frequency (MHz)	Result (kHz)	Limit (MHz)	Verdict
433.92	78.09	1.0848	Pass

5.3 Test result (RSS-210 A1.1.3)

Frequency (MHz)	Result (kHz)	Limit (MHz)	Verdict
433.92	73.88	1.0848	Pass

Explanation : See attached diagram.

Appendix II



– Test setup photo –