



TEST REPORT

Report Number		RAPA11-O-313
Type of Equipment		LF Transmitter
Model Name	U.S.A	MA900R
	Canada	ANT-RFID
FCC ID		VA5JA900R-1A433
IC Number		7087A-A900RA433
Applicant	Name	SEGI LIMITED
	Logo	SEGI
	Address	Room 1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt Rd., Hongkong
Manufacturer	Name	SEGI ELECTRONICS CO., LTD.
	Address	Chenjiapucun, Liaobu Town Dongguan City, Guandong Province, China
Date of reception		July 13, 2011
Date of test		July 18, 2011 to August 25, 2011
Date of issue		August 26, 2011
Total Page		9 pages (including this page)

SUMMARY

The equipment complies with FCC CFR 47 Part 15 Subpart C Section 15.209 and IC RSS-Gen Issue3 2010 and RSS-210 Issue8 2010.

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.

Date : August 26, 2011

Tested by **Chang Young, Choi**
Duplicy General Manager

Date : August 26, 2011

Reviewed by **Sukil, Park**
Executive Managing Director

CONTENTS

	<u>Page</u>
1. General description of EUT	3
1.1 Applicant	3
1.2 Manufacturer	3
1.3 Basic description of EUT	3
1.4 Technical specification of EUT	4
2. General information of test	5
2.1 Standard for measurement method	5
2.2 Description of EUT modification	5
2.3 Test configuration	5
3. Measurement data	6
3.1 Radiated Emission	6
4. List of measuring equipments	9
Appendix 1 : Test Setup Photos	
Appendix 2 : FCC ID Label and location	
Appendix 3 : External Photos of EUT	
Appendix 4 : Internal Photos of EUT	
Appendix 5 : Block Diagram	
Appendix 6 : Schematics	
Appendix 7 : Parts list	
Appendix 8 : Antenna Specification	
Appendix 9 : Operational Description	
Appendix 10 : User's Manual	

1. General description of EUT

1.1 Applicant

- Company name : SEGI LIMITED
- Address : Room 1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt Rd., Hongkong
- Contact person : Eui Seok, Chung
- Phone/Fax : +82-32-623-5550 / +82-32-623-6667

1.2 Manufacturer

- Company name : SEGI ELECTRONICS CO., LTD.
- Address : Chenjiapucun, Liaobu Town, Dongguan City, Guandong Province, China
- Contact person : Eui Seok, Chung
- Phone / Fax : 82-32-623-5550 / 82-32-623-6667

1.3 Basic description of EUT

- Product name : LF Transmitter
- Model name : MA900R(U.S.A.) / ANT-RFID(Canada)
- Serial number : Not available(Proto Type)
- Frequency : TX : 20 kHz, RX : 433.92 MHz
- Channel number : 1 Channel
- Modulation method : ASK
- FCC Rule Part(s) : FCC CFR47 Part 15 Subpart C Section 15.209
- IC Rule Part(s) : IC RSS-Gen Issue3 2010 & RSS-210 Issue8 2010
- FCC classification : DCD / Part 15 Low Power Transmitter Below 1 705 kHz
- IC classification : Licence-exempt Radio Apparatus(All Frequency Bands)
Category II Equipment
- Date of test : July 18, 2011 to August 25, 2011
- Date of issue : August 26, 2011
- Place of test : Head office
C-3601, Dongil Technotown, 889-1, Gwanyang-dong, Dongan-gu,
Anyang-si, Gyeonggi-do, Korea, 483-060

Open area test site

80, Jeil-ri, Yangji-myun, Cheoin-gu, Yongin-si, Gyeonggi-do,
Korea, 449-825

(FCC Registration Number : 337229)

(IC Submission Number : 143881)

(KCC Designation Number : KR0027)

1.4 Technical specification of EUT

Product Name	LF Transmitter
Product Type	One Way Antenna
Size(mm)	115 x 38 x 15 (W x L x H)
Power	DC 12 V from Main Unit
Transmit Frequency	20 kHz by Ferrite coil and Mylar condenser for RFID
Receive Frequency	433.92 MHz by pattern antenna
Modulation Method	ASK

2. General information of test

2.1 Standard for measurement methods

Applied Standard : FCC CFR47 Part 15 Subpart C, IC RSS-210 Issue 8 2010				
FCC	IC	Description of Test	Limit	Result
15.207	-	Conducted Emission(dB μ V/m)	Various	N/A[note 1]
15.209	RSS-210	Radiated Emission(dB μ V/m)	Various	Pass

Note1 : This equipment is supplied DC from main battery unit.

2.2 Description of EUT modification

During the test, there was no mechanical or circuitry modification to improve RF and spurious characteristic, and any RF and spurious suppression device(s) was not added against the device tested.

2.3 Test configuration

- Type of peripheral equipment used

Description	Model Name	Serial No.	Manufacturer	FCC ID
EUT	MA900R	N/A	SEGI LIMITED	VA5JA900R-1A433
Main Unit	MM1090	N/A	SEGI LIMITED	-

- Type of cable used

Device from	Device to	Type of Cable	Cable Number	Length
Main Unit	EUT	Normal	-	1 m

3. Measurement data

3.1 Radiated Emission

3.1.1 Definitions

A field strength emission is emission from the equipment when transmitting into a non-radiating load over fundamental frequency and frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

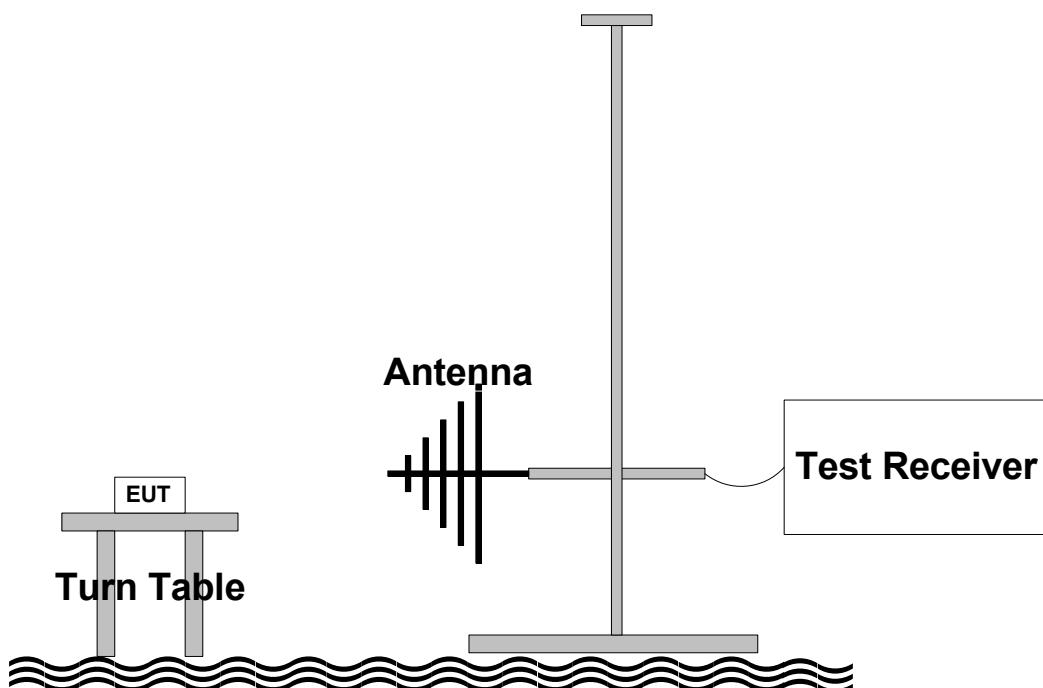
3.1.2 Specification

FCC Rules Part 15 Subpart C Section 15.209
IC Rules RSS-Gen Issue3 2010 and RSS-210 Issue8 2010

3.1.3 Measurement method

ANSI Standard C63.4-2009 8.3

3.1.4 Set-Up



3.1.5 Test equipment list

Equipment	Model Name	Manufacturer
EUT	MR1060	SEGI LIMITED
Spectrum Analyzer	N9020A	Agilent
Loop Antenna	EMCO 6502	EMCO
Bi-conical Antenna	VHA9103	Schwarzbeck
Log Periodic Antenna	VULP9118A	Schwarzbeck

3.1.6 Test procedure

The EUT is placed on a turntable, which is 0.8 meter high above ground.

The turntable rotates 360 degrees to determine the position of the maximum emission level.

EUT is set 3.0 meters away from the receiving antenna, loop antenna and broadband antenna, which is mounted on an antenna mast.

The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level from the EUT. Both horizontal and vertical polarizations of the antenna are set on measurement.

In order to find out the maximum emission levels, all of the EUT location were manipulated according to ANSI 63.4 during the radiated emission measurement.

The EUT was tested in 3 orthogonal planes and worst case was reported.

The bandwidth of test receiver is set at 200 Hz between 9 to 150 kHz, 9 kHz between 150 kHz to 30 MHz, and 120 kHz between 30 MHz to 1 GHz.

3.1.7 Test condition

- Test place : Open area test site
- Test mode : Normal operation
- Test environment : 18 °C, 59 % R.H.

3.1.8 Test result

Frequency [MHz]	Detect Mode [Peak/QP/AVG]	Reading [dB μ V]	Factor [dB/m]	Emission Level [dB μ V]	Measurement Distance [m]	Limit [dB μ V]	Margin [dB]
0.020	Peak	105.7	12.7	118.4	3	121.6	3.2
0.060	Peak	68.3	10.4	78.7	3	112.0	33.3
0.100	Peak	58.8	10.4	69.2	3	107.6	38.4
0.135	Peak	54.6	10.4	65.0	3	105.0	40.0
1.870	Peak	31.2	10.3	41.5	3	70	28.5
15.060	Peak	25.2	10.3	35.5	3	70	34.5
50.000	Peak	20.4	10.3	30.7	3	43.5	12.8
80.000	Peak	23.3	9.3	32.6	3	43.5	10.9

If the Peak mode measured value compliance with and lower than QP and Average mode limit, the EUT shall be deemed to meet QP and Average mode limits and then no additional QP and Average mode and measurement performed.

The worst case position was Y-axis as shown in the Test Setup photos in Appendix 1.

If measurement is executed at 3 m distance, then radiated emission limitation at 3 m distance is adjusted by using the formula of "Ld1 = Ld2 * (d2/d1)²". Example:

Radiated emission limit at 30 m distance is 30 uV/m, then radiated emission limitation at 3m distance is adjusted as;

$$Ld1 = L1 = 30 \text{ uV/m} * (30/3)^2 = 100 * 30 \text{ uV/m}$$

3.1.9 Limit

Frequency (MHz)	Field Strength (μ V/m)	Field Strength (dB μ V/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	48.52 to 13.80	300
0.490 – 1.705	24000/F(kHz)	33.80 to 22.97	30
1.705 – 30.0	30	29.54	30
30 – 88	100	40.00	3
88 – 216	150	43.52	3
216 – 960	200	46.02	3
Above 960	500	53.98	3

4. Test equipments list

The listing below denotes the test equipments for the test(s).

No.	Equipment	Model	Manufacturer	Serial Number	Calibration Due date
1	Spectrum Analyzer	N9020A	Agilent	MY48010456	03/10/12
2	Power Supply	E3633A	Agilent	SG400022272	10/02/11
3	Loop Antenna	6502	EMCO	9609-9087	03/03/12
4	Biconical Antenna	BBAK9137	Schwarzbeck	2217	02/23/12
5	Log-Periodic Antenna	VULP9118A	Schwarzbeck	382	02/23/12
6	Horn Antenna	BBHA 9120 D	Schwarzbeck	395	08/13/12
7	Pre-Amplifier	JS4-00102600-26-5	Miteq	383521	03/10/12
8	Turn Table	N/A	Daeil EMC	N/A	N/A
9	Antenna Mast	EAM4.5	Daeil EMC	N/A	N/A
10	Controller	DE200	Daeil EMC	AAA69813111	N/A