

TEST REPORT

FCC PART 15 B Verification

Applicant	Trade Name	SEBINE Technology, Inc.		
	Address	RN 202, Daedeok Radio Engineering Center, 604. Tarnip-dong, Yuseong-gu, Daejeon, Korea 305-510		
	Telephone Number	82-42-935-2085	Fax Number	82-42-935-2088
Product	Name	RF Modem		
	Model Name	M110A		
	Manufacturer	SEBINE Technology, Inc.		
Test Date	2011. 07. 06. ~ 2011. 07. 06.			
Issued Date	2011. 07. 06.			
Test Procedure	ANSI C63.4-2003			
Applicable Regulation	FCC Part 15			
Equipment Class	Class A			
FCC ID	Y9AM110A			
Test Result	<input checked="" type="checkbox"/> Pass		<input type="checkbox"/> Fail	
Test Engineer		Chief Engineer		
				
Eunjung, Yang		Young, Choi		

CHUNGBUK TECHNOPARK

I, the undersigned, hereby declare that the equipment specified above conforms to the above FCC Rule(s) and Regulation(s) Part 15 as described in the attached test report.

This test report contains only the result of a single test of the sample supplied for the examination.

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1. Test Laboratory

1.1 General Information

Name of Laboratory	CHUNGBUK TECHNOPARK
Representative	Chang-hyun, Nam
Address	685-1 Yangcheong-ri, Ochang-eup, Cheongwon-gun, Chungcheongbuk-do, Korea
Telephone Number	+82-43-270-2000
Fax Number	+82-43-270-2099
Homepage	www.cntp.or.kr

1.2 Location of Test Laboratory

Address	685-3 Yangcheong-ri, Ochang-eup, Cheongwon-gun, Chungcheongbuk-do, Korea
Telephone Number	+82-43-270-2400
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2. Test Rule

2.1 Test Rule Part(s)

Test item(s)	Test Rule Part(s)	Test Result	
Conducted Emission Measurement	Part 15.107	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail
Radiated Emission Measurement	Part 15.109	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

2.2 Equipment Under Test(EUT) Modifications

No modifications were made to the EUT in order to achieve and maintain compliance to the standards described in this report.

3. Description for Equipment Under Test(EUT)

Item	Specification
Name	M110A
Dimension	88.1mm(L) × 85mm(W) × 19.6mm(H) (w/o Antenna, Connector)
Housing	Aluminum
Weight	140g (w/o Antenna)
Power Supply	+12Vdc ±10%, Reverse Power/Ovvoltage/Overcurrent Protection
Current Consumption	Tx 94mA, Rx 88.5mA, WDT Reset 114mA (@12Vdc)
Operating Temperature	-10°C ~ +60°C
RF Features	<ul style="list-style-type: none"> Frequency : 433.0625MHz ~ 434.7625MHz Channel Spacing : 25KHz Transmitter Power : 73dBuV/m Receiver Sensitivity : -116 ~ -120dBm(-116dBm typ.) Modulation : FSK Bandwidth : < 14KHz
Performance	<ul style="list-style-type: none"> Expected Line-Of-Sight Range : Up To 1.5km with $\lambda/4$ Dipole Antenna RF Data Rate : 4.8K Baud, 7.2K Baud
I/O Interface	<ul style="list-style-type: none"> RS232/RS485 Selectable Serial Communication Basic Setting(User Selectable) : Data Bit 8bit, No Parity, 1 Stop Bit User Selectable Baud Using DIP Switch: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 9Pin D-SUB Female Connector
Antenna Interface	<ul style="list-style-type: none"> SMA(Female, Reverse)Connector Impedance 50Ω

4. Configuration of Test System

4.1 Host System Configuration

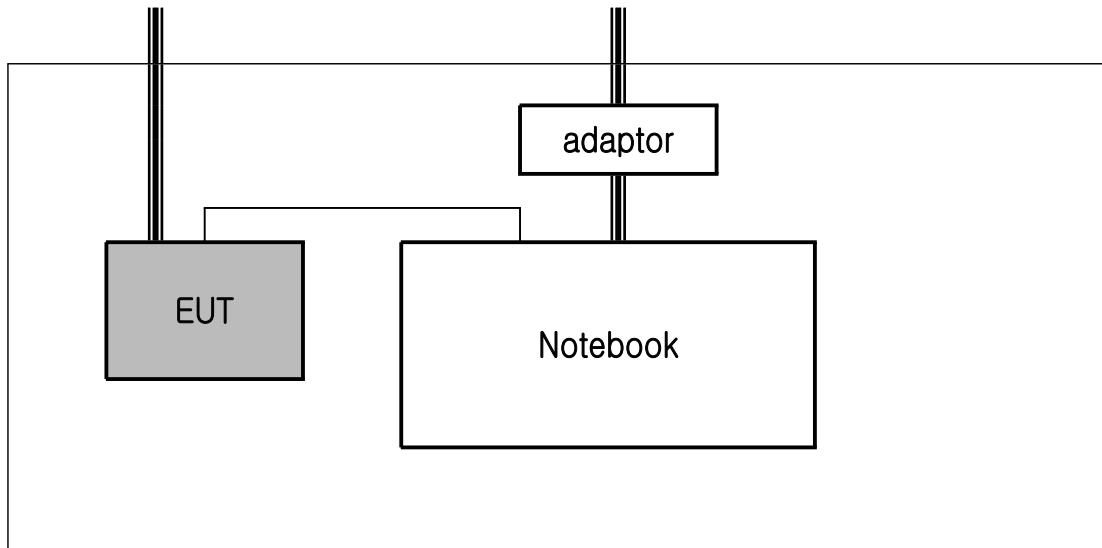
Description	Model Name	Serial Number	Manufacturer	Remarks
RF Modem	M110A	-	SEBINE Technology, Inc.	EUT
Notebook	PP04X	-	DELL	CLASS B
Notebook adaptor	LAP0PS1-00	-	DELL	

4.2 Type of Cables

Port/From		Port/To		Remarks	
Description	I/O Port	Description	I/O Port	Length[m]	Shielded(Y/N)
EUT	Serial	Notebook	RS-232	0.5	N

4.3 Operation of Equipment Under Test(EUT)

The Equipment Under Test was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner and which tends to maximize its emission level in a typical application.

4.4 Setup drawing(s)

==== : Power line
----- : Signal line

5. Test Limits

5.1 Conducted Emission Measurement Limits

Class	Frequency (MHz)	Limits (dBuV)	
		Quasi-peak	Average
Class A	0.15 - 0.5	79	66
	0.5 - 30	73	60
Class B	0.15 - 0.5	66 - 56	56 - 46
	0.5 - 5	56	46
	5 - 30	60	50

5.2 Radiated Emission Measurement Limits

Frequency (MHz)	Class B Limit @ 3m (dBuV/m)	Class A Limit @ 10m (dBuV/m)
30 ~ 88	40.00 (Quasi-peak)	39.08 (Quasi-peak)
88 ~ 216	43.52 (Quasi-peak)	43.52 (Quasi-peak)
216 ~ 960	46.02 (Quasi-peak)	46.44 (Quasi-peak)
Above 960	53.98 (Average)	49.54 (Average)

6. Test Procedure and Results

6.1 Radiated Emission Measurement

6.1.1 Test Equipments

Description	Model Name	Manufacturer	Serial Number	Cal. Due	Used
Test Receiver	ESIB26	Rohde & Schwarz	100359	2012.05.28	■
Antenna	CBL6112D	Schaffner	21784	2012.10.07	■
Antenna Master	MA 4000	inn-co	-	-	■
Turn table	DT 3000	inn-co	-	-	■

6.1.2 Test place : 10m semi-anechoic chamber

6.1.3 Test Environments : Temperatures 27.3 °C, Relative Humidity 43.8 %

6.1.4 Test Procedure

Final measurements of radiated emission were made on the 10 m semi-anechoic chamber. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emission in amplitude, direction and frequency. This process was repeated during final radiated emission measurements on the 10m semi-anechoic chamber range, at each frequency, in order to ensure that maximum emissions amplitudes were attained.

The radiated emission test was performed with EUT exercise program loaded, and the emissions were scanned between 30 MHz to 1 000 MHz using a ESIB26 test receiver. The test receiver's 6 dB bandwidth was set to 120 kHz, and the receiver was operated in the CISPR quasi-peak detection mode.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum emission levels. Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization, herein referred to as H and V, respectively.

$$F1[\text{dBuV/m}] = F2[\text{dBuV}] + AF[\text{dB/m}] + CL[\text{dB}]$$

F1: Final Field Strength F2:Reading AF: Antenna Factor CL: Cable Factor

6.2 Test Results : **Pass** **Fail**

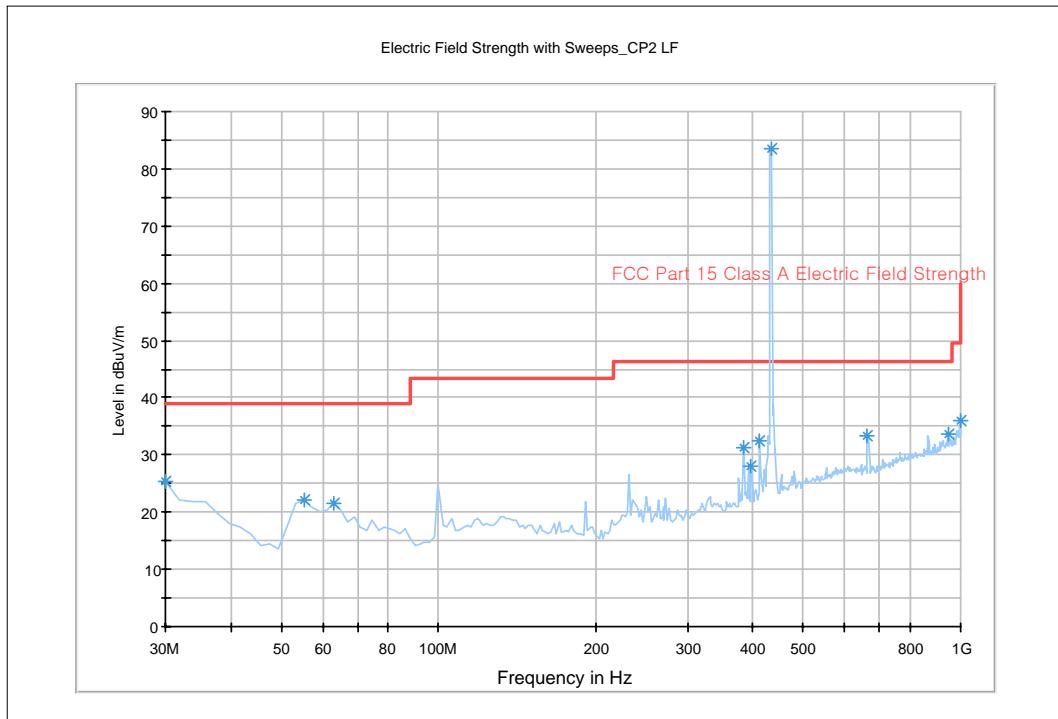
Test Date : 2011. 07. 06.

Frequency (MHz)	Reading (dBuV)	Polarity	Antenna Height (m)	Correction Factor		Limit (dBuV/m)	Level (dBuV/m)	Margin (dB)
				Antenna (dB/m)	Cable (dB)			
30.43	1.19	V	1.00	18.09	1.31	39.00	20.59	18.41
99.85	9.08	V	2.00	10.66	1.94	43.50	21.68	21.82
663.86	4.72	H	1.00	18.12	5.58	46.40	28.42	17.98

Note

1. Margin (dB)=Limit (dBuV/m) - Level (dBuV/m)
2. If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary

[Graphical representation of radiated emissions]



6.3 Conducted Emission Measurement

6.3.1 Test Equipments

Description	Model Name	Manufacturer	Serial Number	Cal. Due	Used
Spectrum Analyzer	ESCI	Rohde & Schwarz	100545	2012.05.26	<input type="checkbox"/>
LISN 1	NNLK8129	Schwarzbeck	8129-162	2012.05.27	<input type="checkbox"/>
LISN 2	ESH2-Z5	Rohde & Schwarz	100146	2012.05.27	<input type="checkbox"/>

6.3.2 Test place : Shield Room

6.3.3 Test Environments : Temperatures °C, Relative Humidity %

6.3.4 Test Procedure

Conducted emission levels were measured on each current-carrying line with the test receiver operating in the CISPR quasi-peak mode (or peak mode if applicable). The receiver's 6 dB bandwidth was set to 9 kHz. The initial step in collecting conducted data is a test receiver peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP". The conducted emission test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the HOT side and NEUTRAL side, herein referred to as H and N, respectively.

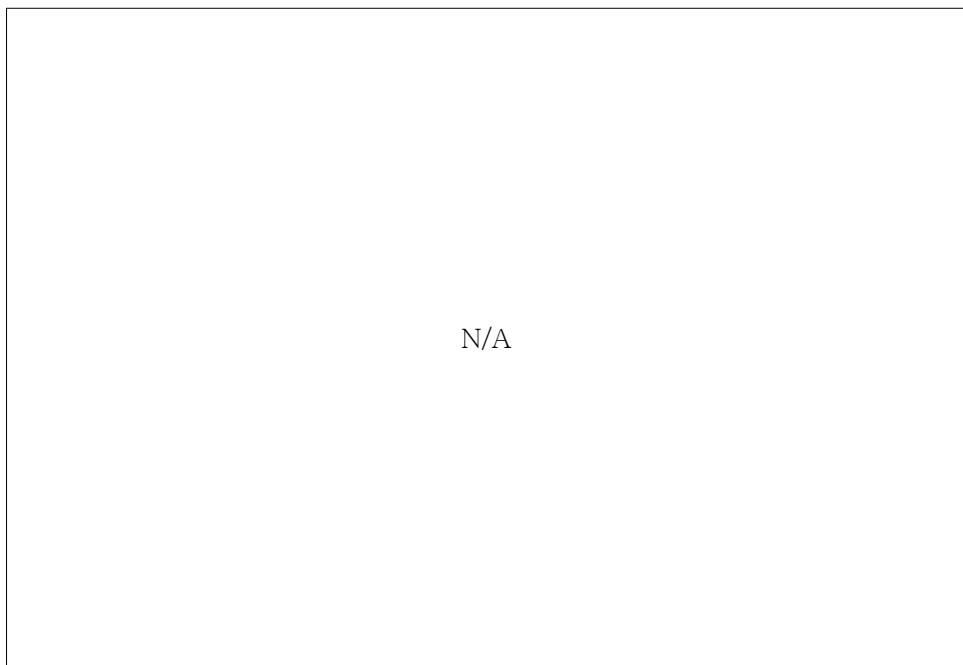
6.4 Test Results : Pass Fail

Test Date :

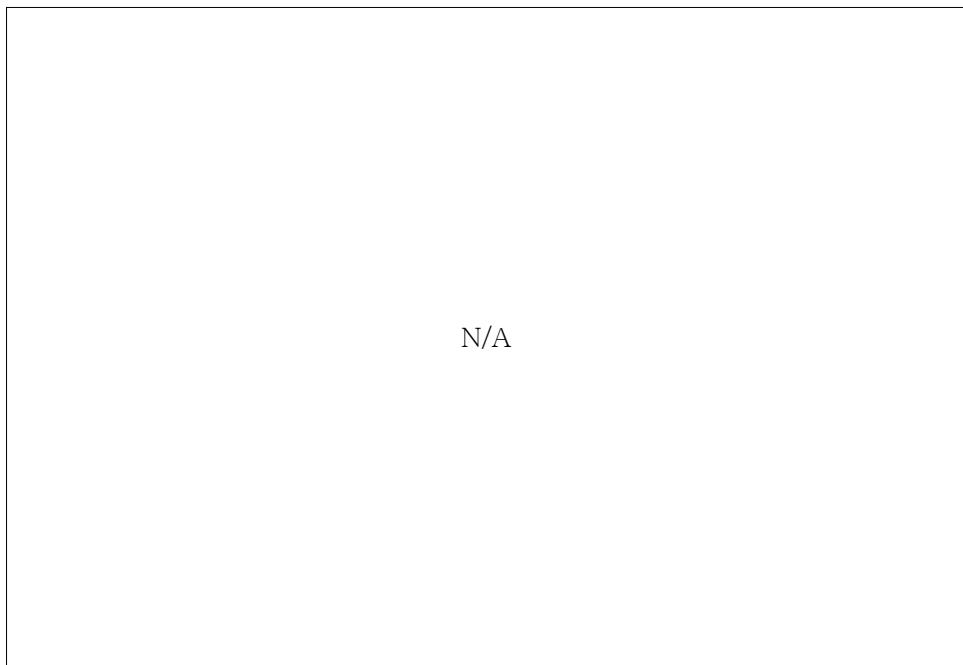
[Graphical representation of conducted emissions]

*  : Quasi-Peak  : Average

* HOT Line



* NEUTRAL Line





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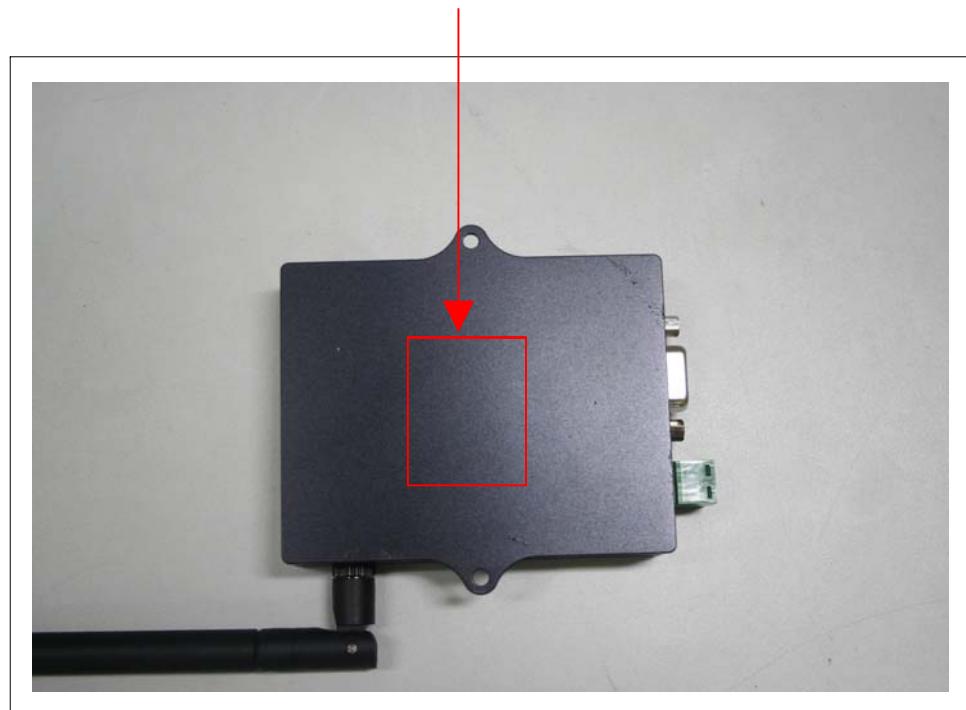
7. FCC Labelling Requirements

7.1 FCC Statement

Product shall be labelled the following statement on the device:

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

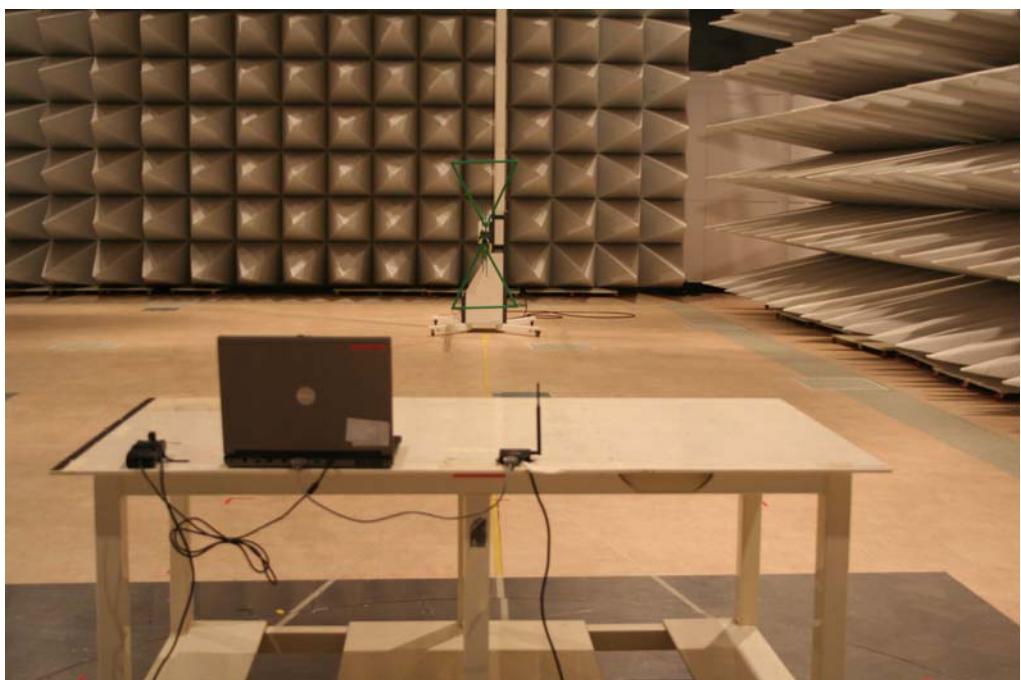
When the device is so small or for such use that it is not practicable to place the statement on it, the information shall be placed in prominent location in the instruction manual or pamphlet supplied to the user. However, the FCC identifier or unique identifier, as appropriate, must be displayed on the device.

7.2 Label Location

8. Test Setup Photographs

8.1 Radiated Emission Measurement

[Front View]



[Rear View]





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8.2 Conducted Emission Measurement

[Front View]

N/A

[Rear View]

N/A

9. Photographs of Equipment Under Test(EUT)**[Front View]****[Rear View]**

[Internal Photograph]

