



# RADIO TEST REPORT

**Test Report No. : 30JE0177-YK-01-A**

**Applicant** : **Alpine Electronics, Inc.**  
**Type of Equipment** : **Bluetooth PWB**  
**Model No.** : **ICS-X8 BT PWB**  
**FCC ID** : **A269ZUA133**  
**Test regulation** : **FCC Part15 Subpart C: 2010**  
**Test result** : **Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

**Date of test:** June 24, 25 and July 1, 5, 2011

**Representative test engineer:**

*S. Takano*

Shinichi Takano  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :**

*I. Isozaki*

Ichiro Isozaki  
Leader of WiSE Japan,  
UL Verification Service

- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.  
 There is no testing item of "Non-accreditation".



**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

13-EM-F0429

**Contents**

	<b><u>Page</u></b>
<b>SECTION 1: Customer information .....</b>	<b>3</b>
<b>SECTION 2: Equipment under test (E.U.T.) .....</b>	<b>3</b>
<b>SECTION 3: Test specification, procedures &amp; results .....</b>	<b>4</b>
<b>SECTION 4: Operation of E.U.T. during testing .....</b>	<b>7</b>
<b>SECTION 5: Carrier frequency separation .....</b>	<b>9</b>
<b>SECTION 6: 20dB bandwidth &amp; Occupied bandwidth (99%) .....</b>	<b>9</b>
<b>SECTION 7: Number of hopping frequency .....</b>	<b>9</b>
<b>SECTION 8: Dwell time .....</b>	<b>9</b>
<b>SECTION 9: Maximum peak output power .....</b>	<b>9</b>
<b>SECTION 10: Spurious emissions (Antenna port conducted) .....</b>	<b>9</b>
<b>SECTION 11: Radiated emission .....</b>	<b>10</b>
<b>Contents of appendixes .....</b>	<b>12</b>
<b>APPENDIX 1: Photographs of test setup .....</b>	<b>13</b>
<b>APPENDIX 2: Test data .....</b>	<b>15</b>
<b>APPENDIX 3: Test instruments .....</b>	<b>55</b>

---

**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**SECTION 1: Customer information**

Company Name : Alpine Electronics, Inc.  
Address : 20-1 Yoshima-Kogyodanchi, Iwaki-City Fukushima, 970-1192 Japan  
Telephone Number : +81-246-36-4111  
Facsimile Number : +81-246-36-8637  
Contact Person : Isamu Takaku

**SECTION 2: Equipment under test (E.U.T.)****2.1 Identification of E.U.T.**

Type of Equipment : Bluetooth PWB  
Model No. : ICS-X8 BT PWB  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : DC 3.3V  
Receipt Date of Sample : May 10, 2011  
Country of Mass-production : China  
Condition of EUT : Engineering prototype (Not for Sale)  
Modification of EUT : No Modification by the test lab

**2.2 Product description**

Model: ICS-X8 BT PWB (referred to as the EUT in this report) is a Bluetooth PWB.

**General specification**

Clock frequency(ies) in the system : CPU:33MHz

**Radio specification**

Equipment type : Transceiver  
Frequency of operation : 2402-2480MHz  
Bandwidth / Channel spacing : 79MHz & 1MHz  
Type of modulation : FHSS  
Antenna type : Pattern antenna  
Antenna connector type : None  
Antenna gain : -1.60dBi  
ITU code : F1D, G1D  
Operation temperature range : -40 to +85 deg.C.

**FCC Part15.31 (e)**

This module provides the Bluetooth part with regulated power supply (DC3.3V). Therefore, the equipment complies with power supply regulation.

**FCC Part15.203 Antenna requirement**

The antenna is not removable. Therefore, the equipment complies with the antenna requirement of Section 15.203.

---

**UL Japan, Inc.****Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **SECTION 3: Test specification, procedures & results**

### **3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2010, final revised on December 6, 2010 and effective January 5, 2011  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.209 Radiated emission limits, general requirements  
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

The EUT complies with FCC Part 15 Subpart B: 2010. The test has been performed by the customer.

### **3.2 Procedures & Results**

<b>Item</b>	<b>Test Procedure</b>	<b>Specification</b>	<b>Remarks</b>	<b>Deviation</b>	<b>Worst Margin</b>	<b>Results</b>
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC Section 15.207	-	N/A *1)	N/A	N/A
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A		-
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (d) Section15.209	Conducted/ Radiated	N/A		5.4dB Freq.: 2400.00MHz Detector: Average Polarization: Horizontal Mode: Tx 2402MHz, 3DH5

Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422

\*1) The test is not applicable since the EUT has no AC mains.

## **UL Japan, Inc. Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN  
Telephone : +81 463 50 6400  
Facsimile : +81 463 50 6401

### 3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators, RSS-Gen 4.6.1	RSS-Gen 4.6.1	Conducted	-	-

Note: UL Japan's EMI Work Procedures No.13-EM-W0420 and 13-EM-W0422.

\* Other than above, no addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Item	Frequency range	No.1 SAC* <sup>1</sup> /SR* <sup>2</sup> (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
<b>Radiated emission</b> (Measurement distance: 3m)	9kHz-30MHz	3.3 dB	2.7 dB	3.4 dB
	30MHz-300MHz	4.7 dB	4.5 dB	4.7 dB
	300MHz-1GHz	4.5 dB	4.6 dB	4.6 dB
	1GHz-13GHz	3.9 dB	3.9 dB	4.0 dB
<b>Radiated emission</b> (Measurement distance: 1m)	13GHz-18GHz	4.8 dB	4.8 dB	4.8 dB
	18GHz-40GHz	4.4 dB	4.2 dB	4.2 dB

\*1: SAC=Semi-Anechoic Chamber

\*2: SR= Shielded Room is applied besides radiated emission

#### Radiated emission test

The data listed in this test report has enough margin, more than site margin.

#### Antenna port conducted test

Power Measurement uncertainty above 1GHz for this test was: (±) 1.3dB

Conducted emissions Measurement (below 1GHz) uncertainty for this test was: (±) 1.9dB

Conducted emissions Measurement (1G-3GHz) uncertainty for this test was: (±) 2.5dB

Conducted emissions Measurement (3G-18GHz) uncertainty for this test was: (±) 3.8dB

Conducted emissions Measurement (18G-26.5GHz) uncertainty for this test was: (±) 4.1dB

Bandwidth Measurement uncertainty for this test was: (±) 5.4%

**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### 3.5 Test location

UL Japan, Inc. Shonan EMC Lab.

1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone number : +81 463 50 6400

Facsimile number : +81 463 50 6401

JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input checked="" type="checkbox"/> No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

### 3.6 Test setup, Data of test & Test instruments

Refer to Appendix 1 to 3.

**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **SECTION 4: Operation of E.U.T. during testing**

### **4.1 Operating mode**

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

<b>Test item</b>	<b>Operating mode</b>	<b>Tested frequency</b>
Carrier frequency separation	Transmitting Hopping ON (DH5/3DH5)/Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5/3DH5)/Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5/3DH5)/Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 -DH1, -DH3, -DH5 -3DH1, -3DH3, -3DH5 ----- -Inquiry	-
Maximum peak output power	Transmitting (Hopping OFF), Payload: PRBS9 -DH5, -2DH5, -3DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5/3DH5), Payload: PRBS9	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

\*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

\*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.  
However, the limit level 125mWof AFH mode was used for the test.

\*EUT has the power settings by the software as follows;

Power settings: Fixed (The setting is not controlled by the software and it is equivalent to that of mass-produced items.)

Software: HCITester2 (ver. 0.991d)

**Justification:** The system was configured in typical fashion (as customer would normally use it) for testing.

**UL Japan, Inc.**

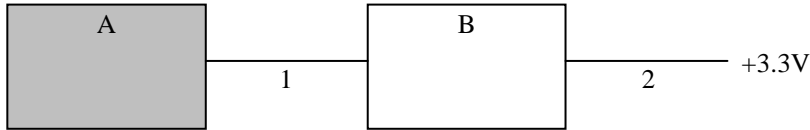
**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## 4.2 Configuration of tested system



\* Test data was taken under worse case conditions.

### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Bluetooth PWB	ICS-X8 BT PWB	001*1) 002*2)	Alpine Electronics, Inc.	EUT
B	Jig	DEBUG	9	Alpine Electronics, Inc.	-

\*1) Used for antenna terminal conducted tests

\*2) Used for radiated emission tests

### List of cables used \*3)

No.	Item	Length(m)	Shield		Remarks
			Cable	Connector	
1	I/F	0.27	Unshielded	Unshielded	-
2	DC	2.5	Unshielded	Unshielded	-

\* All cables used for the measurement are exclusive use or marketed.



## **SECTION 5: Carrier frequency separation**

### **Test procedure**

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 6: 20dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 7: Number of hopping frequency**

### **Test procedure**

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 8: Dwell time**

### **Test procedure**

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 9: Maximum peak output power**

### **Test procedure**

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 10: Spurious emissions (Antenna port conducted)**

### **Test procedure**

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass  
Refer to APPENDIX 2

---

## **UL Japan, Inc.**

### **Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN  
Telephone : +81 463 50 6400  
Facsimile : +81 463 50 6401

---

## **SECTION 11: Radiated emission**

### **11.1 Operating environment**

The test was carried out in No.1 and 3 Semi-Anechoic Chamber.

Temperature : See test data (APPENDIX 2)  
Humidity : See test data (APPENDIX 2)

### **11.2 Test configuration**

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Photographs of the set up are shown in Appendix 1.

### **11.3 Test conditions**

Frequency range : 30MHz to 25GHz  
Test distance : 3m (below 13GHz) / 1m (above 13GHz)  
EUT position : Table top

### **11.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 13GHz) / 1m (above 13GHz). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detection of the test receiver and Spectrum Analyzer.

Frequency	:	30-1000MHz	1000-25000MHz	
Detection Type	:	Quasi-Peak	Peak	* Average
IF Bandwidth	:	120kHz	RBW:1MHz/VBW:3MHz	RBW:1MHz/VBW:See data

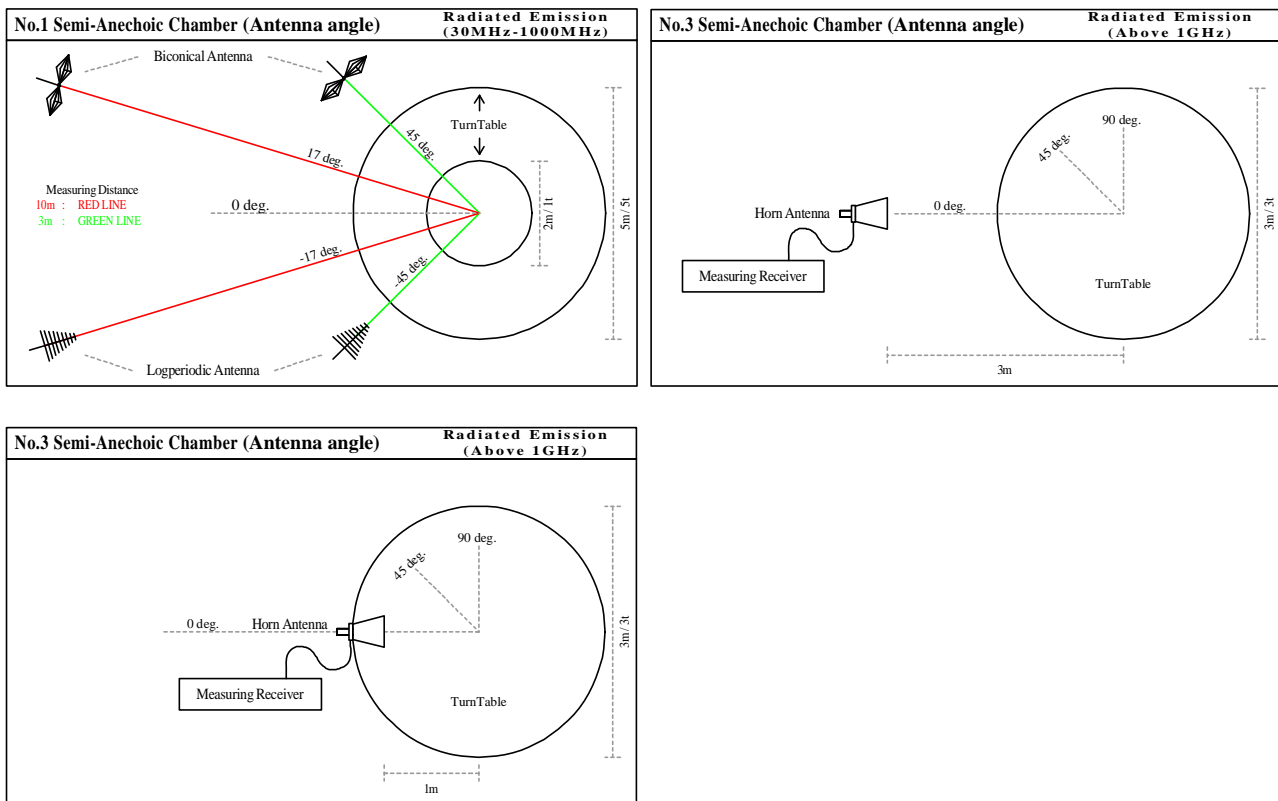
\* When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

\* The VBW was based on the inverse of the duty cycle (Refer to Appendix 2).

The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Worst position: Refer to the Appendix 1.

Figure 1. Antenna angle



### 11.5 Band edge

Band edge level at 2390MHz, 2400MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data.

### 11.6 Results

Summary of the test results : Pass \*No noise was detected above the 5th order harmonics.  
 Refer to APPENDIX 2

## **Contents of appendixes**

### **APPENDIX 1: Photographs of test setup**

Radiated emission  
Pre-check of the worst position

### **APPENDIX 2: Test data**

20dB bandwidth and Carrier frequency separation  
Number of hopping frequency  
Dwell time  
Maximum peak output power  
Spurious emission (Antenna port conducted)  
Radiated emission  
99% Occupied bandwidth

### **APPENDIX 3: Test instruments**

Test instruments

---

**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401