

# RADIO TEST REPORT

**Test Report No.: 31BE0243-SH-01-B**

**Applicant** : Clarion Co., Ltd.  
**Type of Equipment** : Car audio  
**Model No.** : PF-3380I-A  
**FCC ID** : AX2PF3380  
**Test regulation** : FCC Part15 Subpart C: 2010  
**Test result** : Complied


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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.
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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:** October 13 to 17, 2010

**Representative  
test engineer:**

  
Akio Hayashi  
Engineer of EMC Service

**Approved by :**

  
Go Ishiwata  
Assistant Manager of EMC Service

- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.  
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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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MF058d (15.09.10)

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## **SECTION 1: Customer information**

Company Name : Clarion Co., Ltd.  
Address : 7-2 Shintoshin, Chuo-ku, Saitama-shi, Saitama, 330-0081 Japan  
Telephone Number : +81-48-601-4121  
Facsimile Number : +81-48-601-3802  
Contact Person : Masahiko Shibata

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment : Car audio  
Model Number : PF-3380I-A  
Serial Number : See Section 4.2  
Rating : DC13.2V  
Country of Mass-production : China  
Condition of EUT : Engineering prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : October 12, 2010  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: PF-3380I-A (referred to as the EUT in this report) is a Car audio.

Clock frequency:

41.6MHz, 12.288MHz, 10MHz, 9MHz, 32.768kHz, 16.92MHz, 26MHz

Equipment type : Transceiver  
Frequency of operation : 2402-2480MHz  
Bandwidth & channel spacing : 79MHz & 1MHz  
Type of modulation : FHSS  
Antenna type : Chip antenna  
Antenna gain with cable loss : +1.18dBi  
Antenna connector type : None  
ITU code : F1D, G1D  
Operation temperature range : -20 to +60 deg.C.

FCC 15.31 (e)

The equipment provides the Bluetooth transmitter with stable power supply (DC 1.5V and DC 3.3V), therefore, the equipment complies with the requirement.

FCC Part 15.203

The equipment and its antenna comply with this requirement since this antenna is built in the equipment and it cannot be replaced by end users.

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

### **3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2010, final revised on October 13, 2010  
 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

### **3.2 Procedures & Results**

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
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		Complied
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		11.3dB Freq.: 12400MHz Detector: Average Polarization: Vertical, Mode: Tx 2480MHz (DH5)
Note: UL Japan's EMI Work Procedures No.QPM05 and QPM15. *1) The test is not applicable since the EUT has no AC mains.						

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### 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 -		Complied

Note: UL Japan's EMI Work Procedures No.QPM05 and QPM15.

\* 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 (±)
Radiated emission (Measurement distance: 3m)	30MHz-300MHz	4.6 dB	4.5 dB	4.9 dB
	300MHz-1GHz	4.5 dB	4.6 dB	5.1 dB
	1GHz-13GHz	3.9 dB	3.9 dB	4.0 dB
Radiated emission (Measurement distance: 1m)	13GHz-18GHz	4.8 dB	4.8 dB	4.8 dB
	18GHz-40GHz	4.2 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: (±) 0.8dB

Conducted emissions Measurement (below 1GHz) uncertainty for this test was: (±) 1.1dB

Conducted emissions Measurement (1G-3GHz) uncertainty for this test was: (±) 1.2dB

Conducted emissions Measurement (3G-18GHz) uncertainty for this test was: (±) 2.9dB

Conducted emissions Measurement (18G-26.5GHz) uncertainty for this test was: (±) 3.4dB

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

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### 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 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 checked="" 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 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 EMI & Test instruments

Refer to Appendix 1 to 3.

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## **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), Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5/3DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5/3DH5) Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON) -DH1, -DH3, -DH5 -3DH1, -3DH3, -3DH5	-
Maximum peak output power	Transmitting Hopping OFF (DH5/2DH5/3DH5) Payload: PRBS9	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 Hopping ON / Hopping OFF(DH5/3DH5) Payload: PRBS9	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 125mW of AFH mode was used for the test.

\*No function of Inquiry mode

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

MAIN MICOM Version : 011

Bluetooth Firm Ware Version : C310

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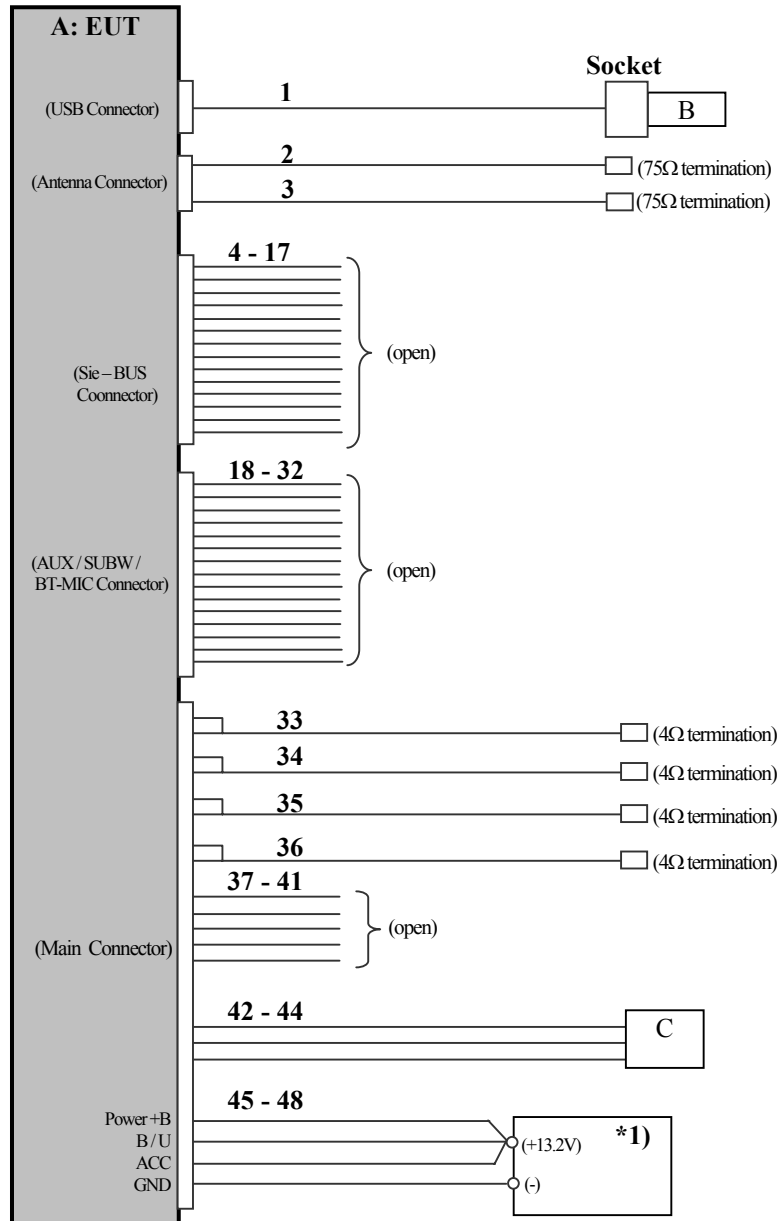
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#### 4.2 Configuration of tested system



\* Test data was taken under worse case conditions.

#### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car audio	PF-3380I-A	*2)	Clarion Co., Ltd.	EUT
B	USB Memory	SDK-USM4GL(B)	-	SONY	-
C	Remote Controller	-	-	Clarion Co., Ltd.	-

\*1) DC power supply (Model No.: PAN60-10A) was used for DC 13.2V input.

\*2) Radiated emission: 0000140, Other test: 0000141

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**List of cables used**

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	USB	1.2	Shielded	Shielded	-
2	FM antenna	0.15	Shielded	Shielded	-
3	FM antenna	0.15	Shielded	Shielded	-
4	B/U	2.0	Unshielded	Unshielded	-
5	BUS +	2.0	Unshielded	Unshielded	-
6	BUS -	2.0	Unshielded	Unshielded	-
7	MUTE	2.2	Unshielded	Unshielded	-
8	BUS ON	2.0	Unshielded	Unshielded	-
9	AUDIO R+	2.0	Unshielded	Unshielded	-
10	AUDIO L-	2.0	Unshielded	Unshielded	-
11	NAVI+	2.0	Unshielded	Unshielded	-
12	BUS OFF	2.0	Unshielded	Unshielded	-
13	GND	2.0	Unshielded	Unshielded	-
14	BUS GND	2.0	Unshielded	Unshielded	-
15	RESET	2.0	Unshielded	Unshielded	-
16	AUDIO GND	2.0	Unshielded	Unshielded	-
17	NAVI GND	2.0	Unshielded	Unshielded	-
18	MIC SHIELD	2.0	Unshielded	Unshielded	-
19	N.C.	2.0	Unshielded	Unshielded	-
20	N.C.	2.0	Unshielded	Unshielded	-
21	AUX R+	2.0	Unshielded	Unshielded	-
22	AUX L+	2.0	Unshielded	Unshielded	-
23	MIC +B	2.0	Unshielded	Unshielded	-
24	MIC IN	2.0	Unshielded	Unshielded	-
25	N.C.	2.0	Unshielded	Unshielded	-
26	N.C.	2.0	Unshielded	Unshielded	-
27	N.C.	2.0	Unshielded	Unshielded	-
28	N.C.	2.0	Unshielded	Unshielded	-
29	AUX ON	2.0	Unshielded	Unshielded	-
30	AUX LR-	2.0	Unshielded	Unshielded	-
31	MIC DET	2.0	Unshielded	Unshielded	-
32	MIC GND	2.0	Unshielded	Unshielded	-
33	Speaker(Rear L)	2.0	Unshielded	Unshielded	-
34	Speaker(Rear R)	2.0	Unshielded	Unshielded	-
35	Speaker(Front L)	2.0	Unshielded	Unshielded	-
36	Speaker(Front R)	2.0	Unshielded	Unshielded	-
37	ANT ON	2.0	Unshielded	Unshielded	-
38	ILL -	2.0	Unshielded	Unshielded	-
39	ILL +	2.0	Unshielded	Unshielded	-
40	UART	2.0	Unshielded	Unshielded	-
41	N.C	2.0	Unshielded	Unshielded	-
42	S.R +1	2.0	Unshielded	Unshielded	-
43	S.R -	2.0	Unshielded	Unshielded	-
44	S.R +2	2.0	Unshielded	Unshielded	-
45	POWER +B	2.0	Unshielded	Unshielded	-
46	B/U +B	2.0	Unshielded	Unshielded	-
47	ACC	2.0	Unshielded	Unshielded	-
48	GND	2.0	Unshielded	Unshielded	-

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **SECTION 5: Radiated emission**

### **5.1 Operating environment**

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

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

### **5.2 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.

### **5.3 Test conditions**

Frequency range : 30MHz to 25GHz  
Test distance : 3m(below 13GHz) / 1m(above 13GHz)  
EUT position : Table top  
EUT operation mode : Refer to SECTION 4.1

### **5.4 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) (Refer to Figure 1). 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	Below 1GHz	Above 1GHz	
Instrument used	Test Receiver	Spectrum Analyzer	
Detector	QP	PK	AV *1)
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *2)

\*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

\*2) The test was performed with VBW 10Hz since the EUT had no intervals during which the transmitter was off (see Appendix).

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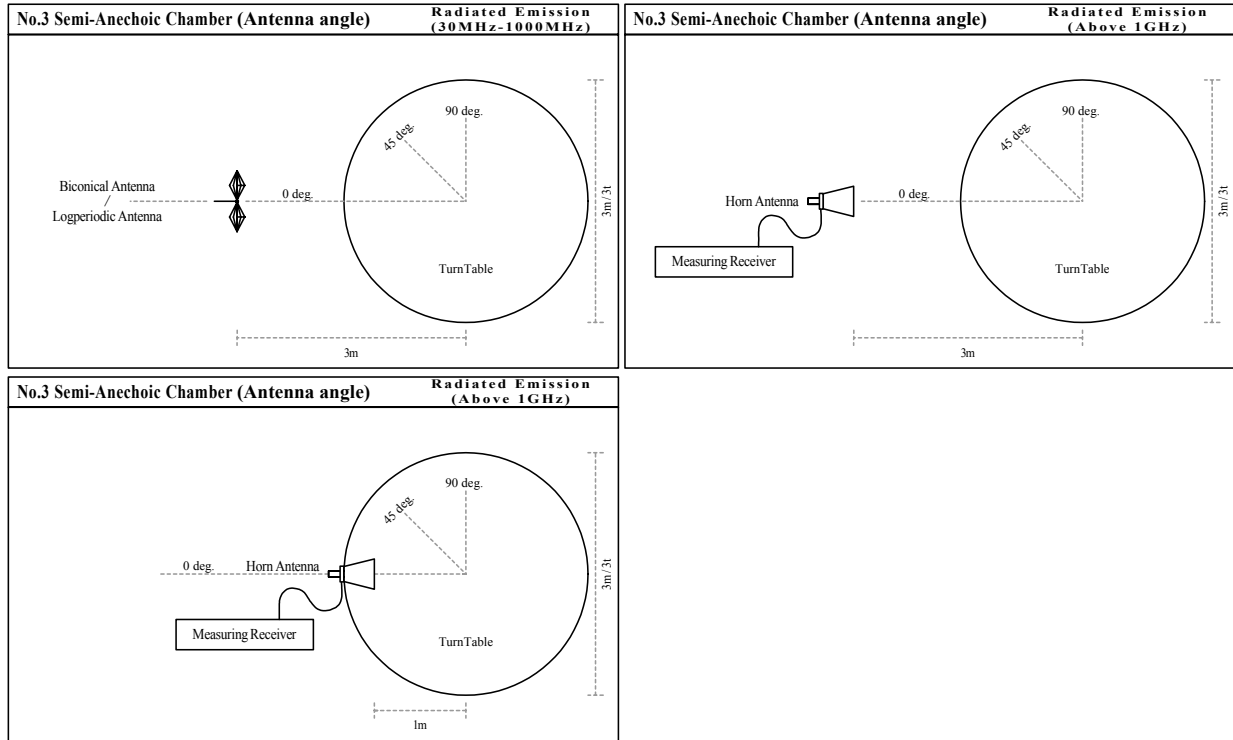
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### **Shonan EMC Lab.**

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Figure 1. Antenna angle



## 5.5 Band edge

Band edge level at 2400MHz(DH5), 2399.602MHz(3DH5), 2399.605MHz(3DH5) and 2400MHz(3DH5) is less than 20dB of peak point of the carrier. Refer to the data of Out of Band Emissions. Band edge level at 2388.7MHz(DH5), 2484.15MHz(DH5), 2483.625MHz(3DH5), 2390MHz and 2483.5MHz are below the limits of FCC 15.209. Refer to the data of Radiated emission.

## 5.6 Results

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

## **SECTION 6: Out of band 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 conducted measurement.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 7: 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 8: 20dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port. The channel separation in Hopping mode and Inquiry mode was separated by 25kHz and 2/3 of the 20dB bandwidth.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 9: 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 10: 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 11: 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

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

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