



RADIO TEST REPORT


Test Report No.: 30KE0186-YK-01-A

Applicant : PIONEER CORPORATION
Type of Equipment : CD RDS Receiver
Model No. : DEH-7300BT
FCC ID : AJDK033
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: September 21 to 23, 2010

Representative
test engineer:


Akio Hayashi
Engineer of EMC Service

Approved by :


Go Ishiwata
Assistant Manager of Shonan EMC Lab.

- ☐ 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

MF058d (15.09.10)

Contents

	<u>Page</u>
SECTION 1: Customer information	3
SECTION 2: Equipment under test (E.U.T.)	3
SECTION 3: Test specification, procedures & results	5
SECTION 4: Operation of E.U.T. during testing.....	8
SECTION 5: Radiated emission	10
SECTION 6: Out of band emissions (Antenna port conducted)	12
SECTION 7: Carrier frequency separation	12
SECTION 8: 20dB bandwidth & Occupied bandwidth (99%).....	12
SECTION 9: Number of hopping frequency	12
SECTION 10: Dwell time	12
SECTION 11: Maximum peak output power.....	12
Contents of appendixes	13
APPENDIX 1: Photographs of test setup.....	14
APPENDIX 2: Test data	15
APPENDIX 3: Test instruments	35

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 : PIONEER CORPORATION
Address : 25-1 Nishi-machi, Yamada-aza, Kawagoe-shi, Saitama, 350-8555, JAPAN
Telephone Number : +81 49 228 6415
Facsimile Number : +81 49 228 6493
Contact Person : Makoto Kaieda

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

2.1 Identification of E.U.T.

Type of Equipment : CD RDS Receiver
Model Number : DEH-7300BT
Serial Number : Refer to 4.2.
Rating : DC 14.4V
Country of Mass-production : China
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : September 16, 2010
Modification of EUT : No modification by the test lab.

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

2.2 Product description

Model: DEH-7300BT (referred to as the EUT in this report) is a CD RDS Receiver.

Clock frequency(ies) in the system : SYSTEM MICRO: 16.93MHz, 12MHz,
 GRILL MICRO: 4.97MHz, CD mechanism: 16.93MHz,
 Tuner: 36.48MHz (VCO: 2.5~3.3GHz), Bluetooth module: 26MHz,
 DC-DC converter: 370.3/434.7kHz

<Radio part>

Equipment type : Transceiver
 Frequency of operation : 2402-2480MHz
 Bandwidth / Channel spacing : 79MHz & 1MHz
 Type of modulation : FHSS
 Antenna type : Pattern
 Antenna connector type : None
 Antenna gain : -2.2dBi
 ITU code : F1D
 Operation temperature range : -10 to +60 deg.C.

The difference between the EUT and its derived models:

Comparison item	DEH-7350BT	DEH-73BT	DEH-7300BT
Destination (port)	ES	UC (WAL-MART)	UC
Sensormatic seal	None	Yes	None
FM frequency range & Step	87.5 to 108 MHz 50 or 100 kHz step	87.9 to 107.9 MHz 200 kHz step	87.9 to 107.9 MHz 200 kHz step
AM frequency range & Step	531 to 1602 kHz (9kHz) 530 to 1640 kHz (10kHz) 9 or 10 kHz step	530 to 1710 kHz (10kHz) 10 kHz step	530 to 1710 kHz (10kHz) 10 kHz step
Display OFF Mode	Yes	None	None

FCC Part15.31 (e)

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

FCC Part15.203 Antenna requirement

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.

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 January 22, 2010 and effective March 1, 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	9.6dB Mode: Tx 2402MHz Freq.: 12010MHz Detector: Average Polarization: Horizontal / Vertical	Complied

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

*1) The test is not applied 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 -		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 ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.4 dB	2.7 dB	3.4 dB
	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%

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 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.

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.

Operation: BT-TEST mode

Test item	Operating mode	Tested frequency
Carrier frequency separation	Transmitting Hopping ON/Inquiry, Payload: PRBS9	-
20dB bandwidth & Maximum peak output power	Transmitting Hopping OFF/Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON/Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON) -DH1, -DH3, -DH5 ----- -Inquiry	-
Spurious emission & Band edge compliance (Conducted) ----- (Radiated)	Transmitting (DH5), Payload: PRBS9 -Hopping ON -Hopping OFF ----- Transmitting (DH5), Payload: PRBS9	Spurious emission: 2402MHz, 2441MHz, 2480MHz Band edge compliance: 2402MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5), 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 125mW of AFH mode was used for the test.

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

Power settings : 4

Software : YWW5049

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

UL Japan, Inc.

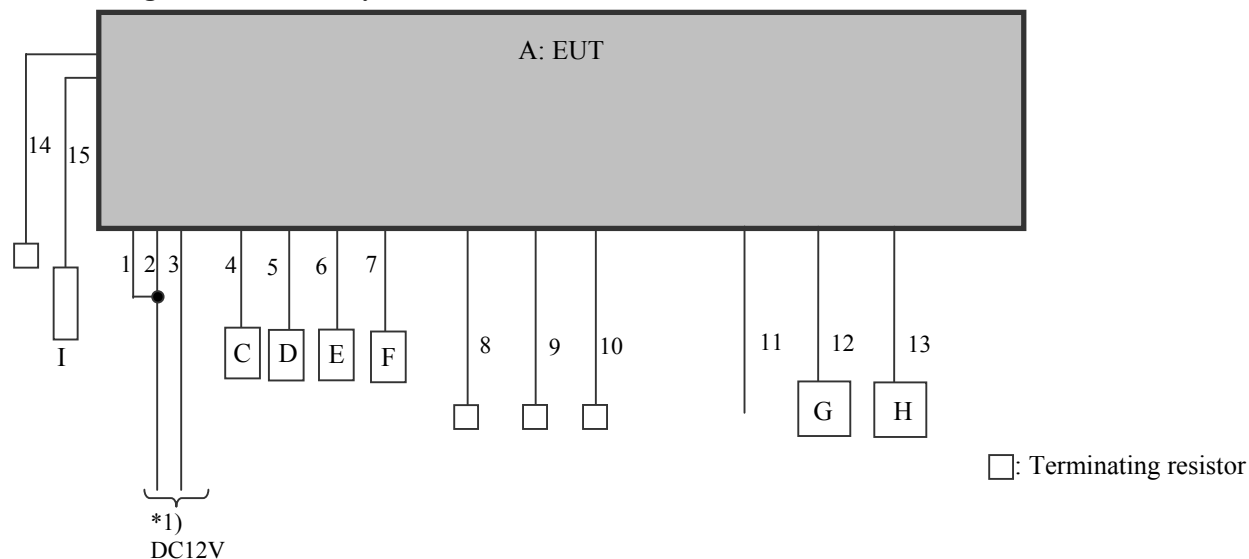
Shonan EMC Lab.

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 *4)	Remarks
A	CD RDS Receiver	DEH-7300BT	TPGE000001UC *2) TPGE000004UC *3)	PIONEER	EUT
C	Dummy speaker load	RHA100N	-	-	-
D	Dummy speaker load	RHA100N	-	-	-
E	Speaker	TS-X350	PB000047	PIONEER	-
F	Speaker	TS-X350	PB000048	PIONEER	-
G	Hands free Microphone	-	-	PIONEER	-
H	Wired remote controller	RM-X2S	-	SONY	-
I	USB memory	Clip Drive	-	BUFFALO	-

*1) DC power supply (Model No.: PAN35-10A) was used for DC 12V input.

*2) Used for Spurious emissions tests (Radiated).

*3) Used for Antenna Terminal Conducted tests.

*4) "PIONEER" means PIONEER CORPORATION or PIONEER ELECTRONICS(SHANGHAI EXPORT ZONE) CO., LTD.

List of cables used *5)

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Accessory	0.1 + 1.5+0.5	Unshielded	Unshielded	-
2	Battery	0.1 + 1.5+0.5	Unshielded	Unshielded	-
3	Ground	0.1 + 1.5+0.5	Unshielded	Unshielded	-
4	Speaker Front L	0.1 +5.9	Unshielded	Unshielded	-
5	Speaker Front R	0.1 +5.9	Unshielded	Unshielded	-
6	Speaker cable Rear L	0.1 +4.8	Unshielded	Unshielded	-
7	Speaker cable Rear R	0.1 +5.9	Unshielded	Unshielded	-
8	Coaxial Antenna	0.2	Shielded	Shielded	Terminated
9	Front Audio Out (RCA)	1.5	Unshielded	Unshielded	Terminated
10	Rear Audio Out (RCA)	1.5	Unshielded	Unshielded	Terminated
11	System Remote	0.1+2.0	Unshielded	Unshielded	-
12	MIC cable	3.9	Unshielded	Unshielded	-
13	Wired remote control	0.1+1.9	Unshielded	Unshielded	-
14	AUX In (Stereo mini)	2.0	Unshielded	Unshielded	Terminated
15	USB cable	1.0	Shielded	Shielded	-

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

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 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.

The rear of EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

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 26GHz
Test distance : 3m (below 13GHz) / 1m(above13GHz)
EUT position : Table top
EUT operation mode : Refer to 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). 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	1000-26000MHz	
Detection Type	:	Quasi-Peak	Peak	* Average
IF Bandwidth	:	120kHz	RBW:1MHz/VBW:3MHz	RBW:1MHz/VBW:270Hz

* 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 EUT was tested in the direction normally used.

UL Japan, Inc.

Shonan EMC Lab.

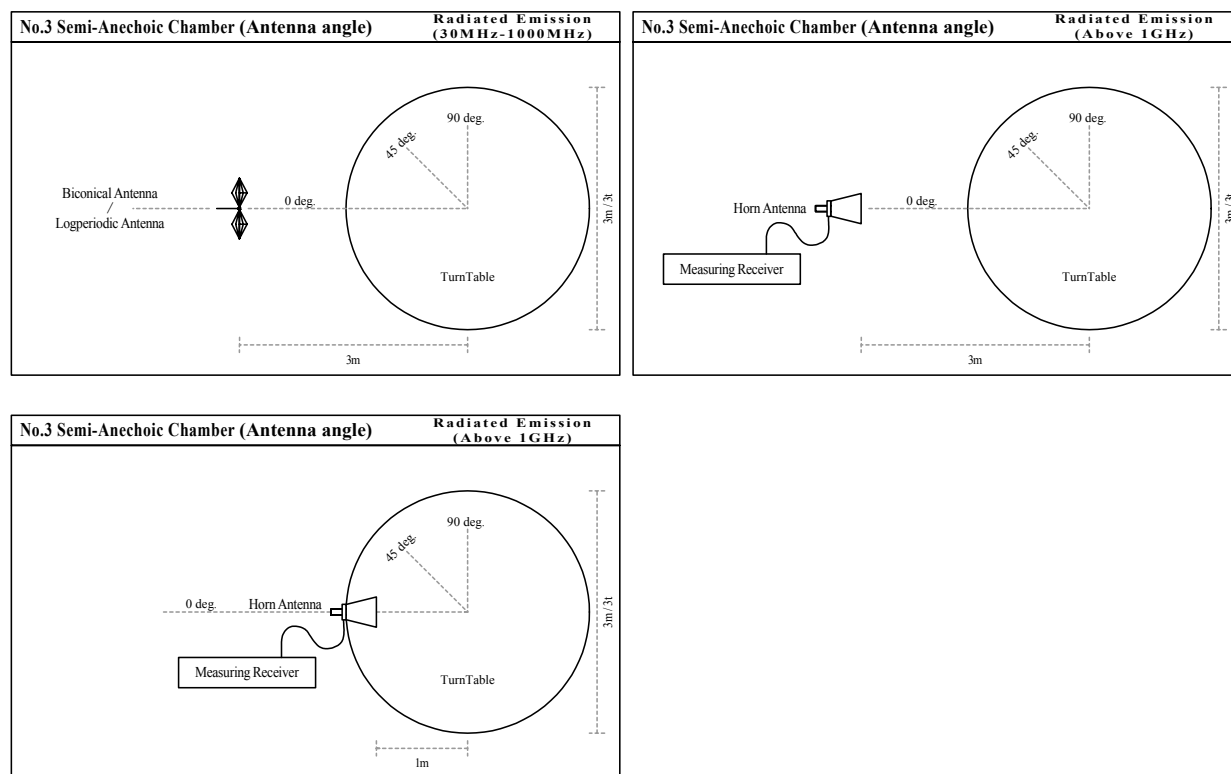
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Figure 1. Antenna angle

No.3 Semi-Anechoic Chamber



6.5 Band edge

Band edge level at 2400MHz is less than 20dB of peak point of the carrier. Refer to the data of Out of Band Emissions (Antenna Port Conducted). Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

6.6 Results

Summary of the test results : Pass *No noise was detected above the third order harmonics.
 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 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 radiated 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

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

Contents of appendixes

APPENDIX 1: Photographs of test setup

Radiated emission	Page 14
-------------------------	---------

APPENDIX 2: Test data

20dB bandwidth and Carrier frequency separation.....	Page 15-17
Number of hopping frequency	Page 18-19
Dwell time.....	Page 20-24
Peak output power	Page 25
Radiated emission	Page 26-29
Spurious emission (Antenna port conducted)	Page 30-33
99% Occupied bandwidth	Page 34

APPENDIX 3: Test instruments

Test instruments	Page 35
------------------------	---------

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