RADIO TEST REPORT

Test Report No.: 31BE0255-SH-01-A

Applicant	:	**PIONEER CORPORATION**
Type of Equipment	:	**CD Receiver**
Model No.	:	**DEH-8018**
FCC ID	:	**AJDK036**
Test regulation	:	**FCC Part15 Subpart C: 2010**
Test result	:	**Complied**

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Date of test: October 14 to 18, 2010

Representative test engineer:

H. Shirasawa

Hikaru Shirasawa
Engineer of EMC Service

Approved by :

Go Ishiwata
Assistant Manager of Shonan EMC Lab.

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LAB
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Testing
RTL02610

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Contents

SECTION 1: Customer information

Company Name	:	PIONEER CORPORATION
Address	:	25-1 Aza-Nishimachi, Yamada, Kawagoe-Shi, Saitama-ken, 350-8555 JAPAN
Telephone Number	:	+81 49 228 6415
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Contact Person	:	Makoto Kaieda

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

2.1 Identification of E.U.T.

Type of Equipment	:	CD Receiver
Model Number	:	DEH-8018
Serial Number	:	Refer to 4.2.
Rating	:	DC 10.5-16V
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 14, 2010
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: DEH-8018 (referred to as the EUT in this report) is a CD Receiver.

Clock frequency(ies) in the system : Main Unit: 4.6875MHz, 18.85MHz, 16.9344MHz, 64MHz, 32MHz, 48MHz
Tuner: 200kHz 71.442MHz, 24MHz, 126MHz, 35.721MHz, 26.864MHz
Bluetooth: 26MHz, 25.8048MHz
CD DRIVE: 16.93MHz, 176.4kHz
Panel: 20MHz, 100kHz

<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	:	U.FL-LP-040
Antenna gain	:	-0.7dBi
ITU code	:	F1D, G1D
Operation temperature range	:	-20 to +65 deg.C.

The difference between the EUT and its derived models:

Comparison item	DEH-8018	DEH-8918
Country of mass-production	China	China
DISC PLAYER	CD	CD
Steering Position	Left	Left
Weight (g)	1900	1900
Subwoofer Pre-out	Yes	No
Appearance		

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.

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	4.3dB (35.712MHz, QP, Vertical) Tx 2402MHz, 3-DH5	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.						

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 report meets the limits unless the uncertainty is taken into consideration.

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%

3.5 Test location

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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
☐ No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ 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.

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

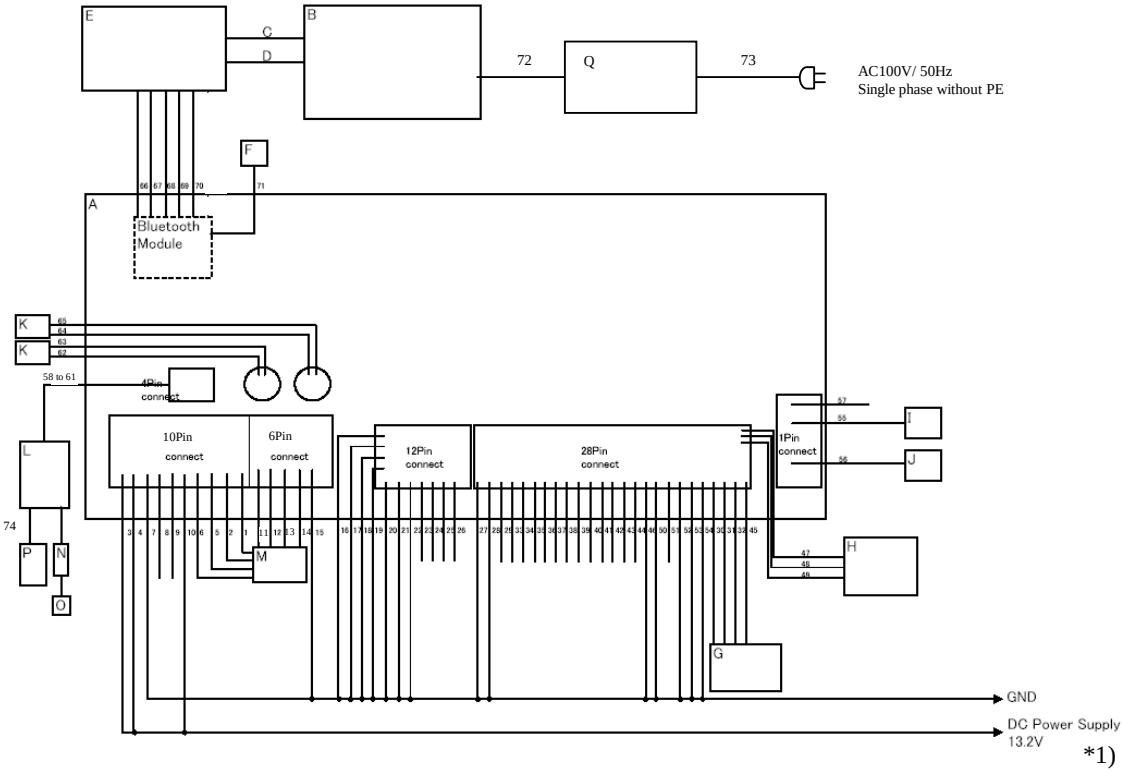
Test item	Operating mode	Tested frequency
Carrier frequency separation	Transmitting Hopping ON/Inquiry, Payload: PRBS9	-
20dB bandwidth & Maximum peak output power	Transmitting Hopping OFF/Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON/Inquiry, Payload: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

*Software for testing: HCITester2 (Rev: 0.99ld)
Power settings: Fixed (The setting is not controlled by the software and it is equivalent to that of mass-produced items.)
Above setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.

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

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	CD Receiver	DEH-8018	AABB999999UC *2) AABB999998UC *3)	PIONEER	EUT
B	Laptop PC	PST311SCWS81K	PSAF3N-0LT02L	TOSHIBA	
C	USB-RS232C transformer	USB-CVRS9	-	SANWA SUPPLY	-
D	USB A-B	KU20-EC	-	Linkman	-
E	Bluetooth control unit	Bluetooth Quick Starter Kit2	-	Denso	-
F	U.FL-SMA transformer	-	-	Hirose	-
G	Microphone	86730-75010	-	KOJIMA PRESS	-
H	Steering switch	-	-	PIONEER	-
I	50 ohm termination	T1302	-	STACK	-
J	50 ohm termination	T1302	-	STACK	-
K	10k ohm termination	-	-	PIONEER	-
L	USB Box	86190-48030	-	Panasonic	-
M	LOAD Box	Pl-10	V13698049	ABO	-
N	Mini Jack Cable	-	-	PIONEER	3m
O	0 ohm termination	-	-	PIONEER	-
P	USB memory	KANAGT	R000/4794	GREEN HOUSE	-
Q	AC Adaptor	ADD_75SBAB	PA3468U-1ACA	TOSHIBA	-

*1) DC power supply (Model No.: PAN35-10A) was used for DC 13.2V input.
*2) Used for Spurious emissions tests (Radiated).
*3) Used for Antenna Terminal Conducted tests.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	FR+	1+1.1	Unshielded	Unshielded	-
2	FR-	1+1.1	Unshielded	Unshielded	-
3	FL+	1+2.0	Unshielded	Unshielded	-
4	FL-	1+2.0	Unshielded	Unshielded	-
5	GND1	1+1.1	Unshielded	Unshielded	-
6	TMU	1+1.1	Unshielded	Unshielded	-
7	ACC1	1+1.5	Unshielded	Unshielded	-
8	AMP	1	Unshielded	Unshielded	-
9	+B1	1	Unshielded	Unshielded	-
10	ILL+	1+2.0	Unshielded	Unshielded	-
11	RR+	1+1.1	Unshielded	Unshielded	-
12	RR-	1+1.1	Unshielded	Unshielded	-
13	ILL-	1+1.1	Unshielded	Unshielded	-
14	RL+	1+1.1	Unshielded	Unshielded	-
15	RL-	1+1.5	Unshielded	Unshielded	-
16	CSLD	1+1.5	Shielded	Unshielded	-
17	CDR+	1+1.5	Shielded	Unshielded	-
18	CDR-	1+1.5	Shielded	Unshielded	-
19	CDL+	1+1.5	Shielded	Unshielded	-
20	CDL-	1+1.5	Shielded	Unshielded	-
21	MUTE	1+1.5	Unshielded	Unshielded	-
22	GND	1+1.5	Unshielded	Unshielded	-
23	TXM+	1	Unshielded	Unshielded	-
24	TXM-	1	Unshielded	Unshielded	-
25	ACC	1	Unshielded	Unshielded	-
26	+B	1	Unshielded	Unshielded	-
27	IG	1+1.5	Shielded	Unshielded	-
28	REV	1+1.5	Unshielded	Unshielded	-
29	ADIM	1	Unshielded	Unshielded	-
30	MACC	2.4	Shielded	Unshielded	-
31	MIN+	2.4	Shielded	Unshielded	-
32	SNS2	2.4	Unshielded	Unshielded	-
33	TX1+	1	Unshielded	Unshielded	-
34	TX1-	1	Unshielded	Unshielded	-
35	SW1	1	Unshielded	Unshielded	-
36	SW2	1	Unshielded	Unshielded	-
37	AGND	1	Shielded	Unshielded	-
38	VSG	1	Shielded	Unshielded	-
39	VV+	1	Shielded	Unshielded	-
40	VV-	1	Unshielded	Unshielded	-
41	IVI+	1	Shielded	Unshielded	-
42	IVI-	1	Shielded	Unshielded	-
43	SPD	1	Unshielded	Unshielded	-
44	SGND	1	Shielded	Unshielded	-
45	MIN-	2.4	Shielded	Unshielded	-
46	LRHD	1+1.5	Unshielded	Unshielded	-
47	CANH	1.2	Unshielded	Unshielded	-
48	CANL	1.2	Unshielded	Unshielded	-
49	SWG	1.2	Unshielded	Unshielded	-
50	SW3	1+1.5	Unshielded	Unshielded	-
51	ADPG	1	Unshielded	Unshielded	-
52	VAR+	1+1.5	Shielded	Unshielded	-
53	VA-	1+1.5	Shielded	Unshielded	-
54	VAL+	1+1.5	Shielded	Unshielded	-
55	SUB	0.15	Shielded	Unshielded	-
56	MAIN	0.15	Shielded	Unshielded	-
57	ANT+	0.15	Shielded	Unshielded	-
58	USV1	1.0	Shielded	Unshielded	-
59	US1-	1.0	Shielded	Unshielded	-
60	US1+	1.0	Shielded	Unshielded	-
61	UGD1	1.0	Shielded	Unshielded	-
62	SWGND	0.95	Shielded	Unshielded	-
63	SWOUT	0.95	Shielded	Unshielded	-
64	SWGND	0.95	Shielded	Unshielded	-
65	SWOUT	0.95	Shielded	Unshielded	-
66	TXD	1.3	Unshielded	Unshielded	-
67	RXD	1.3	Unshielded	Unshielded	-
68	CTS	1.3	Unshielded	Unshielded	-
69	RTS	1.3	Unshielded	Unshielded	-
70	RST	1.3	Unshielded	Unshielded	-
71	Coaxial	0.095	Shielded	Shielded	-
72	DC	1.7	Unshielded	Unshielded	-
73	AC	1.8	Unshielded	Unshielded	-
74	USB	3.0	Shielded	Shielded	-

SECTION 5: Radiated emission

5.1 Operating environment

The test was carried out in No.2 and 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

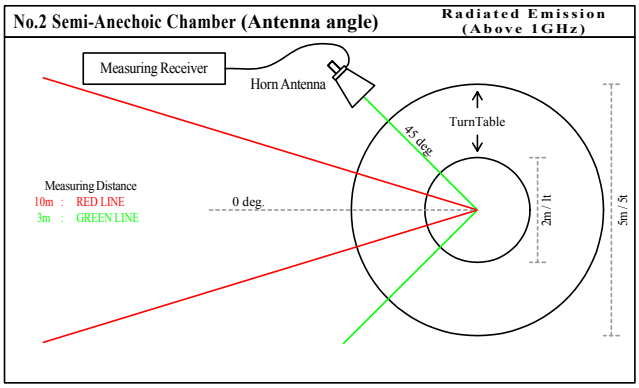
The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m(below 13GHz) / 1m(above 13GHz). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and 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.
.

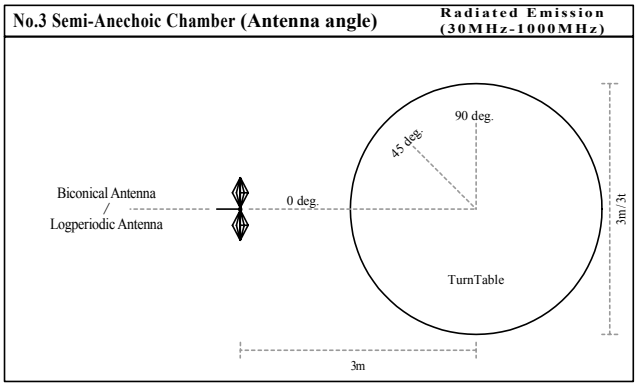
Frequency	:	30-1000MHz	1000-26000MHz	
Detection Type	:	Quasi-Peak	Peak	* Average
IF Bandwidth	:	120kHz	RBW:1MHz/VBW:3MHz	RBW:1MHz/VBW: see data

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

The EUT was tested in the direction normally used.

Figure 1. Antenna angle





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

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

Contents of appendixes

APPENDIX 1: Photographs of test setup

Radiated emission

APPENDIX 2: Test data

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

APPENDIX 3: Test instruments

Test instruments