



## RADIO TEST REPORT

Test Report No. : 28CE0123-HO-A-R1

Applicant : Panasonic Corporation of North America  
Type of Equipment : MAINPCB  
Model No. : YEP0PT30919714  
FCC ID : ACJ932CQ-EP1660  
Test standard : FCC Part 15 Subpart C  
Section 15.207, Section 15.247: 2007  
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 above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.
5. Original test report number of this report is 28CE0123-HO-A.

Date of test:

November 1 to December 27, 2005

Tested by:

Mitsuru Fujimura  
EMC Services

Approved by :

Hironobu Shimoji  
Assistant Manager of EMC Services

NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://uljapan.co.jp/emc/nvlap.htm>

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## **SECTION 1: Client information**

Company Name : Matsushita Electric Industrial Co., Ltd.  
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Contact Person : Akira Nakatsuka

\*Matsushita Electric Industrial Co., Ltd. is on behalf of the applicant: Panasonic Corporation of North America.

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

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

Type of Equipment : MAINPCB  
Model No. : YEP0PT30919714  
Serial No. : 001  
Country of Manufacture : Japan  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No modification by the test lab.  
Rating : DC13.2V  
Receipt Date of Sample : October 31, 2005

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## 2.2 Product Description

Equipment Type	:	Transceiver
Frequency of Operation	:	2402-2480MHz
Bandwidth & Channel spacing	:	79MHz (Hopping On), 1MHz (Hopping Off) & 1MHz
Modulation	:	FHSS
Clock frequency(ies) in the system	:	4MHz, 16.384MHz
ITU code	:	F1D
Power Supply (inner)	:	DC+3.1-3.5V
Antenna Type	:	¼ lambda Dipole Antenna
Antenna Connector Type	:	Fakra Connector
Antenna Gain	:	2.4dBi

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

#### **3.1 Test Specification**

Test Specification : FCC Part15 Subpart C: 2007 \*

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.247 Operation within the bands 902-928MHz,  
2400-2483.5MHz, and 5725-5850MHz

\* The test was performed according to FCC Part 15 Subpart C: 2005. There is no difference in technical requirements applied to the EUT between FCC Part15 Subpart C: 2005 and FCC Part15 Subpart C: 2007. Therefore, the EUT complies with FCC Part15 Subpart C: 2007.

#### **FCC 15.31 (e)**

Input Voltage to Bluetooth module AV is impressed DC+3.1V - 3.5V.

This Input Voltage is supplied to one of the power supply input terminals of the RF-IC chip, Flash memory and B/B-IC chip inside a module.

This Input Voltage is stabilized by +1.5V by the Regulator (Voltage Regulator) equipped in the module, and supplied to other power supply input terminals of B/B-IC chip.

#### **FCC Part 15.203 Antenna requirement**

The EUT has a unique antenna connector (Fakra Connector) and therefore complies with the requirement of 15.203.

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3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin*0)	Results	
1	Conducted emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements ----- IC: RSS-Gen 7.2.2	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.2		N/A	N/A*1)	N/A	
2	Carrier Frequency Separation	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators ----- IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-210 A8.1 (b)	Conducted	N/A	See data.	Complied	
3	20dB Bandwidth	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators ----- IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-210 A8.1 (a)	Conducted	N/A		Complied	
4	Number of Hopping Frequency	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators ----- IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-210 A8.1 (d)	Conducted	N/A		Complied	
5	Dwell time	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators ----- IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-210 A8.1 (d)	Conducted	N/A		Complied	
6	Maximum Peak Output Power	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators ----- IC: RSS-Gen 4.8	FCC: Section15.247(b)(1) ----- IC: RSS-210 A8.4 (2)	Conducted	N/A		Complied	
7	Band Edge Compliance	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators ----- IC: -	FCC: Section15.247(d) ----- IC: RSS-210 A8.5	Conducted	N/A		Complied	
8	Spurious Emission	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators ----- IC: RSS-Gen 4.9 RSS-Gen4.10	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen7.2.1 and 7.2.3	Conducted/ Radiated	N/A		<Tx> 0.1dB, 4960MHz, Ver, AV <Rx> 8.9dB, 804.834MHz, Hor, QP	Complied
<p>Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.</p> <p>*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.</p> <p>*1) This test is not applicable, because the EUT does not have AC mains and is installed into vehicle.</p>								

\*These tests were also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems".

\*These tests were performed without any deviations from test procedure except for additions or exclusions.

### 3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	Conducted	N/A	N/A	N/A

### 3.4 Uncertainty

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

#### Spurious Emission (Radiated)

The measurement uncertainty for this test using Biconical antenna is  $\pm 4.88\text{dB}(3\text{m})$ .

The measurement uncertainty for this test using Logperiodic antenna is  $\pm 4.86\text{dB}(3\text{m})$ .

The measurement uncertainty for this test using Horn antenna is  $\pm 5.77\text{dB}$ .

<Tx> The data listed in this report meets the limits unless the uncertainty is taken into consideration.

<Rx> The data listed in this test report has enough margin, more than the site margin.

#### Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test is  $\pm 3.0\text{dB}$ .

### 3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

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### 3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

### **4.1 Operating Modes**

<b>Test</b>	<b>Mode</b>	<b>Tested frequency</b>
Carrier Frequency Separation	Transmitting (Tx)(Hopping ON)/Inquiry	2402MHz 2441MHz 2480MHz
20dB Bandwidth Maximum Peak Output Power	Transmitting (Tx)(Hopping Off)/Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Transmitting (Tx)(Hopping ON)/Inquiry	-
Dwell time	Transmitting (Tx)(Hopping ON)/Inquiry -DH1 -DH3 -DH5	-
Suprious Emission (Conducted/Radiated)	Transmitting (Tx), DH5	2402MHz 2441MHz 2480MHz
	Receiving (Rx), DH5	2441MHz
Band Edge Compliance (Conducted)	Transmitting (Tx), DH5 -Hopping ON -Hopping OFF	2402MHz 2480MHz
	(Radiated)	Transmitting (Tx), DH5
99% Occupied Bandwidth	Bluetooth Transmitting (Tx), DH5 -Hopping ON -Hopping OFF	2402MHz 2441MHz 2480MHz

\*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.

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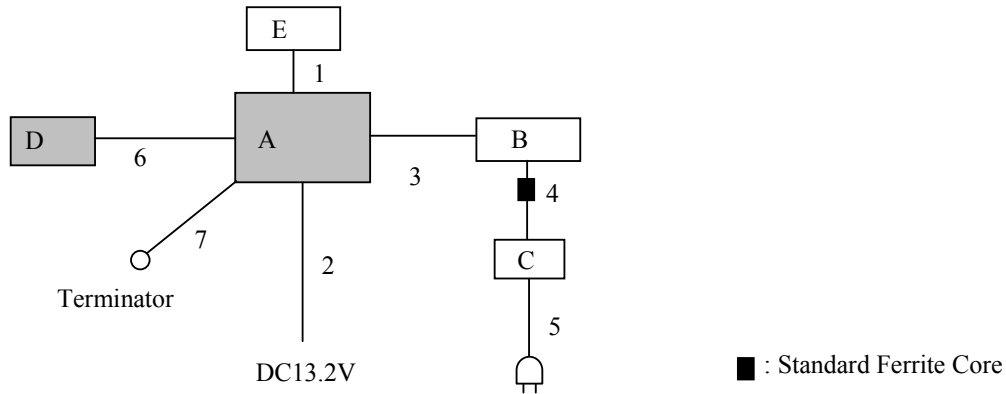
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## 4.2 Configuration and peripherals



\* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	MAINPCB	YEP0PT30919714	001	Matsushita	EUT
B	Display	DC_BR204 *1)	-	Hitachi	-
		BR204_DISP_C_EN.EJU *2)	50419083	Matsushita	
C	AC Adaptor	SEA60N2-120	04X32114	SANKEN ELECTRIC	*1)
D	Antenna	AG90	A211 820 33 75	Matsushita	EUT
E	Escutcheon	-	-	Matsushita	-

\*1) Used for Antenna terminal measurement

\*2) Used for Radiated emission test

### List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Flat Cable	0.4	Unshielded	Unshielded	-
2	DC Cable	2.0	Unshielded	Unshielded	-
3	LVDS Cable	0.8*1), 0.5*2)	Unshielded	Unshielded	-
4	DC Cable	1.9	Unshielded	Unshielded	*1)
5	AC Cable	1.2	Unshielded	Unshielded	*1)
6	Antenna Cable	0.5	Unshielded	Unshielded	-
7	FM Antenna Cable	1.0	Unshielded	Unshielded	-

\*1) Used for Antenna terminal measurement

\*2) Used for Radiated emission test

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**SECTION 5: Spurious Emission**

**[Conducted]**

**Test Procedure**

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

**Test data** : APPENDIX 3

**Test result** : Pass

**[Radiated]**

**Test Procedure**

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 80cm above the conducting ground plane. The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Upper 10GHz).

The height of the measuring 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 with the Test Receiver, or the Spectrum Analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

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

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.

**20dBc was applied to the frequency over the limit of FCC 15.209 / Table 2 of RSS-210 2.7 (IC) and outside the restricted band of FCC15.205 / Table 1 of RSS-210 2.7 (IC).**

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer
Detector	QP: BW 120kHz(T/R)	PK: RBW:1MHz/VBW: 1MHz
IF Bandwidth	20dBc : RBW: 100kHz VBW: 300kHz (S/A)	AV: RBW:1MHz/VBW:10Hz 20dBc : RBW:100kHz/VBW:300kHz

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

**Test data** : APPENDIX 3

**Test result** : Pass

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## **SECTION 6: Bandwidth**

### **Test Procedure**

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

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 7: Maximum Peak Output Power**

### **Test Procedure**

The test was made with the spectrum analyzer that has a function of channel-power measurements.  
The Maximum Peak Output Power was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 8: Carrier Frequency Separation**

### **Test Procedure**

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

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 9: Number of Hopping Frequency**

### **Test Procedure**

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

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 10: Dwell time**

### **Test Procedure**

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

Test data : APPENDIX 3  
Test result : Pass

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